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A SCHEMATIC OUTLINE OF THE EMOTIONS¹

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What is an Emotion? Hard and fast definitions are not possible in the psychology of emotion, but formulations are possible and sometimes help us to assemble our facts. A formulation which will fit a part of the emotional group of reactions may be stated as follows: *An emotion is an hereditary pattern-reaction involving profound changes of the bodily mechanism as a whole, but particularly of the visceral and glandular systems.*² By pattern-reaction we mean that the separate details of response appear with some constancy, with some regularity and in approximately the same sequential order each time the exciting stimulus is presented. It is obvious that if this formulation is to fit the facts, the general condition of the organism must be such that the stimulus can produce its effect. A child alone in a house on a stormy night with only a dim candle burning may display the reaction of fear at the mournful hoot of an owl. If the parents are at hand and the room is well lighted, the stimulus may pass

¹ The material here presented was not prepared primarily for presentation in a psychological journal. It is published in the hope that its main defects as an introductory presentation of the main observable facts about the emotions may be pointed out.

² Throughout this paper we have introduced physiological concepts into the behavior study of emotions. It is possible that we have given the impression that we are writing a physiology of the emotions. Such is not the case. It is perfectly possible for a student of behavior entirely ignorant of the sympathetic nervous system and of the glands and smooth muscles, or even of the central nervous system as a whole to write a thoroughly comprehensive and accurate study of the emotions—the types, their interrelations with habits, their rôle, etc. We have tried to connect emotional activity with physiological processes because it seems that such formulations are now practical and no longer purely speculative.

unreacted to. Stimulus then in this sense is used in a broad way to refer not only to the exciting object but also to the general setting. There is implied also the fact that the general state of the organism must be sensitive (capable of being stimulated) to this form of stimulus at the moment. This condition is very important. A young man may be extremely sensitive to the blandishments of every female he meets while in the unmarried state and may show considerable excitement and over-reaction on such occasions. In most cases, he becomes considerably less sensitive after being happily married. This formulation may seem somewhat roundabout—somewhat like saying that a stimulus is an emotional stimulus only when one gets the pattern-reaction, but this is very nearly the case. Possibly we can illustrate most easily what we mean by choosing an example from animal life. When the naturalist comes suddenly upon a young sooty tern under four days of age, it lies stock still (it is capable of very rapid locomotion): It can be pushed about or rolled over without explicit forms of response appearing. The moment the intruder moves away, the fledgling may hop to its feet and dash away or give one of its instinctive cries. The pattern-reaction, *i. e.*, the explicit observable pattern, is very simple indeed—a death feint or posture. Such a type of response is quite common in the animal world. In order to bring about such a tremendous variation in behavior in an animal usually so active there must be a profound modification of the organic processes. The locus of the effect (the implicit side), lies principally in the visceral system. Often, however, the skeletal musculature is involved in the pattern. A serviceable way to mark off an *emotional* reaction from an *instinctive* reaction is to include in the formulation of emotion a factor which may be stated as follows: The shock of an emotional stimulus throws the organism for the moment at least into a chaotic state.¹

¹ It is most interesting that with many psychologists and with a good many physiologists and neurologists the newer conceptions of experimental zoölogy make slow progress. Experimental biologists and students of animal behavior have begun to put the emphasis upon accurate statements about what really happens in hereditary adjustments rather than to seek in them the exposition of the dogma that they exist

When in the state of shock the subject makes few adjustments to objects in his environment. In contrast to this stand the instincts. The subject under the influence of an instinctive stimulus usually does something: He throws his hand up for defense, blinks his eyes or ducks his head; he runs away; he bites, scratches, kicks and grasps whatever his hand touches. This distinction cannot be applied in every case of emotional activity, as we shall see in our next paragraph. In any event it cannot be pushed too far. We might express it in another way by saying that in emotion the radius of action lies within the individual's own organism; whereas in instinct the radius of action is enlarged to such an extent that the individual as a whole may make adjustments to the objects in his environment.

Additional Formulations.—The above formulation fits of course only the more stereotyped forms of emotional response. When we take into account the whole group of phenomena in which we see emotional manifestations in adults, a pronounced modification is necessary. Apparently the pattern as a whole gets broken up. At any rate it largely disappears (the parts never wholly disappear) except under unusual conditions, and there can be noted only a reinforcement or inhibition of the habit and instinctive (exaggerated and depressed reflexes) activities taking place at the moment. We mean to imply here only the generally observed facts typified by such popular expressions as "He is working at a low ebb today," "His tone is low," "He's a gloom;" in psychopathology when this phase is more marked, *depressions* are spoken of. The opposite picture is popularly portrayed by such expressions as "Jones is full of pep today," "He is excited," "happy," "He is working with a punch;" in psychopathology, the exaggerated type of this behavior is termed *manic*. It will be noted that these expressions refer to the activity level at which all of an individual's acts are accomplished, *i. e.*, they do not refer to the pattern type of because they are useful or serviceable. No one who has watched animals display their hereditary forms of activity from birth to the adult stage could hold that more than a few, considering the thousands which exist, fit such a philosophic and really vitalistic mold. The case of the human infant is not different.

emotion. Only in pathological cases, or in the case of normals in periods of a cataclysmic nature such as war, earthquake, and the sudden death of loved ones, do we get a complete return to the original and more infantile type of emotional response.

Observation would seem to suggest the following formulation: Organized activity (hereditary and acquired) may go on and usually does go on at a given level. We may call the most usual, *the normal level*, or level of equilibrium. It varies with different individuals and one can determine it even with respect to a single individual only after observing him for a considerable time. We may note further that an individual at one time may exhibit more energy, push, or pep, than normal; we may call this the *excited level*. Again at times he works at a level lower than normal; we may call this the *depressed level*.

Without neurologizing too much, we may venture the assumption that in adults environmental factors have brought about the partial inhibition of the more external features of the primitive pattern types of emotion. The implicit, mainly glandular and smooth muscular side of the pattern, remains. The emotionally exciting object releases important internal secretions which, without initiating new part reactions, reinforce or inhibit those actually in progress.¹ This hypothesis would account for changes in level. Only in rare cases do we see mere changes in level. Usually when such changes occur certain auxiliary or additional part reactions appear such as we see in whistling while at work, keeping time with the feet, drumming on the table, biting the finger nails. These types of reaction are singled out and spoken of in some detail under the head *Emotional Outlets* (p. 184).

¹If it is true that the thyroid, hypophysis, adrenal and sex glands accelerate metabolism and that the parathyroid, the pancreas and the thymus retard it as is sometimes stated, the observed changes in emotional level find easy explanation. If the emotional stimulus, either directly or through a conditioned reflex mechanism, influences the glands which accelerate metabolism, the excited emotional level will appear. On the other hand, if the stimulus influences the glands which retard metabolism, the depressed level will result. If neither group of glands is stimulated, there will be an absence of emotional tone. In other words, the individual will in such cases work at his normal level.

The Genetic Study of Emotion in the Child.—Unfortunately for the subject of psychology, few experiments have been made upon the emotional life of the child under anything like as favorable conditions as obtain in the study of animals. Our observations upon the child are similar to those which were made upon animals before Thorndike and Lloyd Morgan introduced the experimental method. Until very recently, in spite of volumes written upon it, it has been of the armchair variety. The superstition that the human infant is too fragile for study is giving way to a more sensible viewpoint. It has been proven practicable in some laboratories to take infants from birth and to study them from the same point of view that animals are studied, giving due consideration to those factors in behavior which do not appear in animal response. But unfortunately this work is handicapped because there are no facilities in maternity wards for keeping the mother and child under close observation for years, a condition which is indispensable for real systematic work.

Summary of Positive Results, Early Types of Emotional Reactions.—After observing a number of infants, especially during the first months of life, we suggest the following group of emotional reactions as belonging to the original and fundamental nature of man: *fear, rage and love* (using *love* in approximately the same sense that Freud uses *sex*).¹

Fear.—What stimulus apart from all training will call out fear responses; what are these responses, and how early may they be called out? The principal situations which call out fear responses seem to be as follows: (1) To suddenly remove from the infant all means of support, as when one

¹ This list is identical with James's list of coarser emotions except for the omission of grief, which James puts first. Grief we look upon as being a *reactive state* (connected with love, really) in which the object or situation which usually calls out in the subject the reactions of love is suddenly removed. The state of grief must be looked upon as a mal-adjustment period, where the objects and situations which have usually called out both the original love responses and the conditioned reflexes built upon them are lacking. The state (in normal cases) disappears as soon as new objects are found or new conditioned reflexes have been entrained. We use these terms which are current in psychology with a good deal of hesitation. The student is asked to find nothing in them which is not fully statable in terms of situation and response. Indeed we should be willing to call them emotional reaction states, *X, Y and Z*. They are far more easily observable in animals than in infants.

drops it from the hands to be caught by an assistant. (In the experiment the child is held over a bed upon which has been placed a soft feather pillow); (2) by loud sounds; (3) occasionally when an infant is just falling asleep or is just ready to waken, a sudden push or a slight shake is an adequate stimulus; (4) when an infant is just falling asleep, occasionally the sudden pulling of the blanket upon which it is lying will produce the fear responses. (2) and (3) above may be looked upon as belonging under (1). The responses are a sudden catching of the breath, clutching randomly with the hands (the grasping reflex invariably appearing when the child is dropped), blinking of the eyelids, puckering of the lips, then crying; in older children possibly flight and hiding (not yet observed by us as 'original' reactions). In regard to the age at which fear responses first appear, we can state with some sureness that the above mentioned group of reactions appears at birth. It is often stated that children are instinctively afraid in the dark. While we shall advance our opinion with the greatest caution, we have not so far been able to gather any evidence to this effect (p. 173, 174). When such reactions to darkness do appear they are due to other causes; darkness comes to be associated with absence of customary stimulation, noises, etc. (They should be looked upon as conditioned fear reactions.) From time immemorial children have been 'scared' in the dark, either unintentionally or as a means of controlling them (this is especially true of children reared in the South).

Rage.—In a similar way the question arises as to what is the original situation which brings out the activities seen in rage. Observation seems to show that the *hampering of the infant's movements* is the factor which apart from all training brings out the movements characterized as rage. If the face or head is held, crying results, quickly followed by screaming. The body stiffens and fairly well coöordinated slashing or striking movements of the hands and arms result; the feet and legs are drawn up and down; the breath is held until the child's face is flushed. In older children the slashing movements of the arms and legs are better coöordinated and appear

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as kicking, slapping, and pushing. These reactions continue until the irritating situation is relieved and sometimes do not cease then. Almost any child from birth can be thrown into a rage if its arms are held tightly to its sides; sometimes even if the elbow joint is clasped tightly between the fingers the response appears; at times just the placing of the head between cotton pads will produce it. This was noticed repeatedly when testing eye coöordinations in infants under ten days of age. The slight constraint put upon the head by the soft pads would often result in a disturbance so great that the experiment had to be discontinued for a time.

Love.—The original situation which calls out the observable love responses seems to be the stroking or manipulation of some erogenous zone, tickling, shaking, gentle rocking, patting, and turning upon the stomach across the attendant's knee. The response varies—if the infant is crying, crying ceases, a smile may appear, attempts at gurgling, cooing and finally, in slightly older children, the extension of the arms which we should class as the forerunner of the embrace in the acts of courtship. The smile and the laugh which Freud connects with the release of repression (we are not denying in the case of adults that this may be true) we should thus class as original reaction tendencies intimately connected, in our opinion at least, from infancy with the stimulation of the erogenous zones.

These types fit fairly well the general formulation we gave on page 165. There is a reaction pattern, there is a definite stimulus which has its peculiarly exciting character (the reason for which must be sought in biology), the radius of action is small, no particular adjustment is made to any object in the environment. It is admitted however that the responses contain both explicit and implicit components, that is, involve the skeletal musculature, the visceral system, the smooth muscles and glands. It is probable though that if the exciting stimulus were sufficiently strong, *e. g.*, strong enough to produce 'shock,' or if continued for a sufficient length of time, the subject would tend to take on more and more the purely vegetative type of existence illustrated by

the example of the young tern. In rage the child becomes so stiff and holds its breath for such a long time that it is often necessary to soothe it. The final stage in any great emotion would seem to be paralysis or the 'death feint.' Approximations to this condition are seen in the paralysis of fear, in the fainting under strong emotional excitement, in the stereotyped reactions of the stoics and martyrs when they unflinchingly resist the torch. Individuals on the battlefield likewise are able to withstand operations, wounds and injuries without complaint. It must be admitted that there is a constant tendency for the organized habit response of the individual to disappear under the extremes of emotion. So far as we can see, this tendency towards stereotypy, paralysis or the death feint under the immediate effect of a strong emotional excitement has no biological or adaptive value (see p. 193, however, on post-emotional state). The organism exhibiting it is at the mercy of its enemies, whether on the battlefield or in the struggle for food among savage tribes, and is at a disadvantage in the race for a much-sought-after woman, or in the fight for business and scientific reputation.

Negative Results of Experimental Study.—Three babies from the Harriet Lane Hospital were put into various situations, the types of which are illustrated below, for the purpose of finding out whether there is a wider range of stimuli that may arouse an emotional reaction than the one we cited a moment ago. These babies represented splendid, healthy types. Their mothers were the wet nurses belonging to the hospital. They were 165, 126 and 124 days of age respectively. The first two, whose ages are given, were put through the more numerous tests. The experiments given below are interesting for the reason that the babies had never been out of the hospital and had never seen an animal. A summary of the tests on Thorne, a girl 165 days of age, is given below.

A very lively, friendly *black cat* was allowed to crawl near the baby. She reached for it with both hands at once. The cat was purring loudly. She touched its nose, playing with it with her fingers. It was shown three times. Each time she reached with both hands for it, the left hand being rather more active. She reached for it when it was placed on a lounge before her, but out of reach.

Then a *pigeon* in a paper bag was laid on the couch. The pigeon was struggling,

and moving the bag about on the couch and making a loud rattling noise. The baby watched it intently but did not reach for it. The pigeon was taken out of the bag on the couch before her, cooing and struggling in the experimenter's hands. She reached for it again and again, and failing of course to get hold of it put her hands in her mouth each time. She was allowed to touch its head. The pigeon moved its head about with quick, jerking movements. It was then held by its feet and allowed to flap its wings near the baby's face. She watched it intently, showing no tendency to avoid it, but did not reach for it. When the bird became quiet she reached for it and caught hold of its beak with her left hand.

Test with a Rabbit.—The animal was put on a couch in front of her. (The child was sitting on her mother's lap.) She watched it very intently, but did not reach for it until the experimenter held it in his hands close to her; then she reached for it immediately, catching one of its ears in her left hand, and attempted to put it into her mouth.

The last animal presented to her was a *white rat*. She paid little attention to it, only fixating it occasionally. She followed it with her eyes somewhat when it moved about the couch. When held out to her on the experimenter's arm, she turned her head away, no longer stimulated.

172 Days Old.—The baby was taken into a dark room with only an electric light behind her, not very bright (faint illumination). A stranger held the baby. The mother sat where she could not be seen. A dog was brought into the room and allowed to jump up on the couch beside her. The baby watched intently every move the dog made, but did not attempt to reach for it. Then she turned her head aside. The other light was turned up and the dog again exhibited. The infant watched very closely every move the dog and the experimenter made, but did not attempt to catch the dog. Exhibited no fear reactions, no matter how close the dog was made to come to her.

The *black cat* was then brought in (both lights on). The cat rubbed against the baby's feet and put her front paws in the baby's lap, touching its nose to her hand. The baby watched intently and reached for it with her left hand. The front light was then turned out. The experimenter held the cat closer to her and she reached for it with both hands.

Rabbit.—She reached for it with both hands as soon as the experimenter came into the room with it in his arms. The front lights were turned on. The rabbit was held out to her. She reached for it at once with both hands, trying to put her fingers in its eyes. She caught hold of a piece of fur above the rabbit's eye and pulled hard.

Pigeon.—The front light was turned out. She reached for the bird with her left hand before the experimenter was ready to present it to her. The pigeon's wings were released and it fluttered violently just in front of the baby's eyes. She continued to reach for it with both hands even when the wings brushed her face. When the bird was quiet it was presented to her again. She reached for it even more eagerly. She tried to take hold of the pigeon's beak with her left hand, but failed because the bird continually bobbed its head. The light was then turned on. The pigeon again flapped wildly. The baby looked at it intently with widely opened eyes, but this time did not reach. She showed no fear however. It was then held out to her again when it had become quiet. She reached for it at once with both hands, held the feathers and tried to put her fingers into its eyes.

175 Days Old.—The baby was placed in a small chair and tied in and put behind a screen so that she could not see any of the people in the room. The dog was allowed to walk suddenly around the screen in front of her. She showed no fear

when the dog rubbed against her legs. She did not reach for him however. While she was still in the same position, the experimenter held the pigeon in front of her and allowed it to flap its wings. She reached for it with both hands the moment it was presented to her and did not withdraw her hands while the bird was flapping its wings. She continued to reach as the bird was moved out of her range.

The cat was then brought around the screen and placed on the couch just in front of the baby's chair. She did not reach for it, but followed it with her eyes. It was held very close to her. She reached for it with her left hand and touched its head. The cat was then moved away, but she continued to reach for it. Then the cat put its front feet in her lap. She reached with her left hand and followed with her right, touching its ears.

Rabbit.—She reached with her left hand at once when the rabbit was still too far away to touch. When it came close to her she reached with her left hand and touched it.

She was then taken into the dark room with both lights turned out and seated in a small chair. A newspaper was lighted before her and allowed to burn in a large metal bucket. She watched it intently from the moment the match was struck until the flames died down. She showed no fear, but did not attempt to reach.¹

While being tested in the large room for eye-hand coöordination, the dog suddenly began to bark at someone entering the room. He was quite near the baby. He barked loudly and jumped about at the end of the leash. The baby became perfectly still, watching intently with widely opened eyes, blinked at the bark, but did not cry.

179 Days Old.—She was taken out to Druid Hill Park in an automobile for the first time in her life. She was wide awake the whole time. She was carried rather rapidly through the grounds of the small zoo at the park. The camel was braying and came up to the fence as we approached, rubbing rather violently against the fence, coming within a few feet of the baby. This produced no fear reaction and no constant fixation. She was then taken to the cages containing the cinnamon and black bears. She gazed at them from time to time, but with no constant fixation. We then took her into the monkey house which contained also a large number of parrots and other smaller birds. The monkeys came to the sides of the cage and from time to time attacked the wires. Three or four times they came up and made threatening movements and actually caught the experimenter by the arm. The child did not seem to be in the least afraid. The peacocks were making their rather uncanny sounds within twenty feet of her, but she did not turn her eyes towards the source of the sound. She was then taken back to the camel yard and the camel again 'performed' nicely. Two camels came up to each other and rubbed noses and put their heads over the dividing fence. The baby was within two or three inches of the camel's nose on several occasions, but while she followed the movements with her eyes, she showed no pronounced reactions of any kind. She was then taken to the Shetland pony, who put his nose through the wires and showed his teeth. She was within a few inches of his mouth. Outside of following movements of the eyes, no reactions were observable. She was taken near two zebras. They came to the edge of the fence, within a few inches of the baby. The zebras were possibly followed slightly more intently with the eyes, but there was no other observable reaction. While the baby was watching the zebras an ostrich came close to her and brought its head to the wire, but did not strike the wire violently. During approximately half of the experiment the baby was carried by her

¹ When tested seven days later with this she micturated, but no general fear reaction appeared (possibly normal bladder reflex).

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mother and the rest of the time by the experimenter's secretary. She had never been carried by this individual before. At times the mother was kept out of the range of the baby's vision.

Baby Nixon, girl, 126 days of age, had just learned the eye-hand coördination. She was put through exactly the same series of situations. Slight differences appeared, e. g., when the cat rubbed its head against the baby's stomach, there was a distinct start, a tendency to stiffen. While the experimenter was out of the room getting the rabbit, three persons were left with the baby in the dark room (dim light). All were sitting very quietly. She was being held by a stranger. Suddenly the baby began to cry and had to be given to the mother for a few moments. She quieted down immediately. Again when the pigeon flapped its wings near the baby's face, she gave a distinct jump, but did not cry or show other signs of fear. When the dog was made to bark (lighted room), the baby blinked her eyes at every bark, but gave no other reaction. She smiled throughout most of the situations. She smiled all through the burning of the paper in the dark room.

It is thus seen that this unusual opportunity of testing children's reactions to their first sight of animals yielded few positive results. At least we can say that the older statements which maintain that violent emotions appear must be very greatly modified. Of course it is always possible that the children were too young, but this has not very much weight since we have tested children from birth through to 200 days. These children left the hospital shortly after the tests and further experimentation could not be made. As a control test, similar observations were made upon a colored baby girl (Lee) 200 days of age, who had been under observation from birth. She lived in the city under the usual environmental conditions. Exactly the same results were obtained. There was practically no evidence of fear.

Conditioned Emotional Reflexes.—This baby's reactions to darkness were tested at 115 days. Lee (as well as many others) had been tested many times in the dark room with negative results but she had not been tested for many days before the present observation was made. The following extracts bring out most of the points.

115 Days Old.—The baby was quiet. She was taken by the mother to the dark room and placed on a couch in the center of the room. The light was turned out. For the first two minutes she kept quiet, then grew fussy, and at the end of five minutes cried. The experimenter went in and turned up the light and left her there. She stopped crying, but at the end of two minutes was crying as lustily as when she was in the dark.

122 Days Old.—Taken to dark room with light left on. She began to fret

at the end of forty-five seconds, crying loudly at the end of seventy seconds. Cried loudly for a minute and forty-five seconds. She was then taken out and quieted and afterwards returned to the dark room. She began to cry when she was placed on the floor. After a test in a well-lighted room on the eye-hand coördination, she was taken back to the dark room with the lights on. She began to cry immediately while being placed on the floor.

129 Days Old.—She cried whenever she was left in the room alone.

136 Days Old.—The baby was left in the dark room with the light on. She began to fuss in one minute and to cry at the end of two minutes. The experimenter went in and stood in front of her without touching her. This did not stop her crying. Then the mother went in and stood in front of her without touching her, but this did not stop her. The moment the mother picked her up, crying ceased.

Although there is little new in this example that throws light upon the emotions, nevertheless it shows most clearly at how early an age the human infant learns to control the actions of its attendants. The conditioned reflex evidently has a genuine function.

Are there other Original Emotional Patterns?—It is thus seen that so far our attempts to bring out emotional patterns distinct from those enumerated on pages 169 ff have been barren of result. If it were possible to continue such experiments through a much longer span of a child's life, and if we could face him with a much larger number of situations that more nearly touch his daily life activities, it might be possible to extend the list. It is realized that we are working here with very young members of the human species. A good deal of organization and development takes place after two hundred days. Some very complex situations have yet to be faced, such as masturbation (and in boys especially, the first masturbation after puberty); the first menstruation period in girls; complex situations connected with family life, such as quarrels between the parents, corporal punishment, death of loved ones, all of which have to be met with for a first time. We know from later observation that these do become hitched up to emotional reactions; whether they are original or transferred does not appear from our studies. It would be especially desirable to study the reaction states we now designate by the names of shame and shyness, embarrassment, in this connection. We are of the opinion that most of the asserted emotions are of the consolidated

type (that is, emotion plus instinct, plus habit) or emotional attitudes. These are discussed on page 186.

Attention is called here to the limitations of the genetic method. As long as we can keep the baby under constant observation, a great deal of simplification can be obtained in the study of the emotions, but the human infant is a part of a social group and must sooner or later be returned to it. Things happen so fast then that a separate tabulation of events cannot be made. Under ordinary conditions, the emotions take care of themselves in a normal child, that is, society, including of course the parents and the family group, furnishes its own corrective for failure to react emotionally, for wrong emotional reaction and for over or under reactions. At times, however, due either to defective environment or to defective heredity, the emotions may go wrong. The genetic method is not of service. The emotional life of the individual must then be studied by the psychopathologist. Again, in business and professional life (especially in the Army and Navy), more and more emphasis is being placed upon what may be called emotional temperament. It is thus evident that the applied psychologist must have some means of making studies of emotional activity in adults. Finally, the scientific psychologist, for methodological and purely technical reasons, devises methods for the study of emotions in the hope that they will yield scientific results, or that his methods may prove of such value that they can be employed by the psychopathologist, by the criminologist and by the applied psychologist. A short account of the methods which can be used where the genetic method is not applicable follows:

Methods Employed in the Detection of Implicit Emotional Response.—The explicit portions of the pattern reaction in emotion are, as we have tried to indicate, usually the least important constituents. When they appear, systematic observation enables us to note them with sufficient scientific accuracy. In the study of criminals, of psychogenic disorders and of normal individuals, often all explicit emotional manifestations disappear. The exciting situation is complex. On

the one hand it inhibits overt vocal response, but on the other initiates a train of (visceral) implicit activity. Questioning the subject may reveal nothing. He may deny that the stimulus produced any reaction whatever, and yet the next moment he may drop his cigarette, bite his nails, or hesitate or stumble over a word. Popularly we speak in such cases of deceit, concealment of the emotion, 'repressions.' In many cases, however, the individual would report his observations upon himself correctly, if he could observe them, but the movements may be of such a fleeting character as to escape observation, or his intellectual level may be of such a low grade that he cannot make the observation. In such cases there are often so many disturbing factors that self-observation is not possible. Several methods are in use by means of which we can detect the implicit side of emotion.

1. *The Controlled Association Word Reaction.*—The subject is told to respond immediately with a word to a given visual or auditory word stimulus. The stimulus words are made up before the test. Some of the words are neutral, the others are the 'significant' words which refer to the emotional situation. The indicators of implicit response or tension obtained from the subject are unduly long reactions (with occasional appearance of explicit forms such as the giggle, dropping the eyes, a flush); significant response words, showing that the stimulus word was a part of the emotional setting; repetition of the same word; too rapid responses; low level responses; failure in responses (there are several variations in this method).

2. *The Free Association Method.*—The subject is started on any selected word, possibly a fragment from a dream, and told to 'speak the words as they come.' He begins. For a time the words come freely and then they fail. There is blockage. New associated lines are begun. Sooner or later, however, in disturbed cases all lines seem to converge and blockage occurs whatever the start may have been. The blockage seems to occur at the point where the words relating to the emotionally exciting object belong in the associated train of words.

3. Dream study and analysis often reveal emotional tension. They may be studied by the common sense method of questioning the patient now from one angle now from another, but they are often analyzed by employing the two methods described above singly or in combination. Dreams are a part of a person's total reaction. They are as good indicators of the nature of his personality, of his stresses and strains and emotional life generally, as are any of his other activities. We have already stated that we can judge the emotional level of an individual by watching his daily routine of activity. To make this statement complete, the dream activity in sleep and day-dreams must be taken into account. These are word reactions but not isolated reactions or reactions of the muscle twitch kind. They are connected and associated activity, fully as complete oftentimes as house-building, delivering a lecture, or putting through a big business deal. The study of dreams, since the dream language is extremely symbolic, requires individuals especially trained in that field.

4. The study of slips of word or pen, poor adjustments, over and under reactions, bodily postures and attitudes. These can be studied by general observation and by the methods which are employed in the study of dreams.

In discussing these methods, it should be stated that the psychologist busies himself with them principally from a methodological standpoint, that is, by determining the range of applicability, their reliability, the best technique, etc. The psychopathologist uses them for practical purposes. The reshaping and rebalancing of a personality often depends upon the finding of situations connected with an emotion, or upon finding out whether there is an emotion where normally there should be one. He uses all of the above methods, and in addition his common sense, combining it all with general observation of the patient's whole personality. In gathering his data, it is often necessary and desirable for him to question the patient upon the significant events of his life history; the things he is naturally inclined to do and inclined not to do (positive and negative reaction tendencies);

the books he has read, the way they affected him; the types of situation in real or dramatic life which influenced him most; his main emotional assets; the easiest way to get an emotional rise out of him; the trend of his daydreams and the types of aircastles he builds; what his chief lines of sensitiveness are; his conflicts and temptations, and the way he finds himself meeting these difficulties. A full discussion of these factors requires more space than we can give.

In addition to the above methods, several others are being developed:

5. The determination of increased sugar in the blood or urine before and after presentation of a stimulus when there is reason to infer that the stimulus is not without significance (page 189).

6. The emotional questionnaire of Woodworth, and the various character analysis outlines. The subject answers by 'yes' or 'no' a series of questions, such as: Were you considered a bad boy? Were you shy with other boys? Do you know of anybody who is trying to do you harm? Did you ever make love to a girl? Have you ever had any great 'mental' shock? Does it make you uneasy to have to cross a wide street or an open square? Did you ever feel a strong desire to steal things? Did you ever have the habit of biting your finger-nails? Do your feelings keep changing from happy to sad and from sad to happy without any reason? Have you ever been afraid of going insane? If there is unstable emotional temperament, the fact is supposed to be revealed by the nature of the answers.

7. The so-called psycho-galvanic reflex. Here the subject sits in a quiet room with two non-polarizable electrodes upon two parts of the body. The electrodes are connected to a sensitive galvanometer. A definite deflection of the needle is obtained. Emotional stimuli are then given, and their effect noted by the deflection of the needle. So far in our laboratory this method has not been found serviceable. It is hoped, however, that with an improved technique, the action currents in the heart revealed by the string galvanometer can be made to yield serviceable results.

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8. The so-called expressive methods. These consist of the recording of the respiratory changes, vaso-motor changes; automatic writing and drawing (planchette). Such methods in general have proven of slight value. The respiratory curve is a very sensitive indicator (showing conditioned reflexes quite clearly) but it is subject to so many influences that the significant changes are often obscured and their interpretation is made difficult. This is equally true of vaso-motor changes.

Substitution of Stimulus: Attachments and Detachments:—Under the action of environmental factors (habit influences) situations which originally did not call out emotional response come later to do so. This enlargement of the range of stimuli capable of calling out emotional activity is responsible largely for the complexity we see in the emotional life of the adult. We obtain some of the clearest and at the same time some of the simplest examples of stimulus substitutions of this type in the animal world. In 1905 the author while working with rats had a small trap door in the home alley in a maze. The animals in running the final lap would walk over the trap, throw it, and thus shut themselves off in the food box. The trap sank somewhat as the animals passed over it and made considerable noise when released (noise and lack of support, see page 169). After running over it once or twice, the animals showed every sign of fear—crouching, trembling, panting, defecating. They refused to eat. After two or three more trials, they began to jump the whole trap. The noise and the slight sinking of the trap which so terrified them was thus avoided, *but nevertheless the fear reaction remained*. Even after the trap had been removed and the floor made perfectly smooth, the rats continued for many trips to jump at the old position of the trap, springing over just as though the trap were actually present. Every evidence of fear remained. We see the same substitutions very clearly in the horse. If a horse is violently frightened at a certain point on the road by a terrifying object (a rolling paper in one observed case), it may exhibit the fear reaction when again passing over that part of the road although the

terrifying object is no longer present. A shaky bridge will make a sensitive horse terror-stricken, and this will endure long after the bridge has been made of concrete.

The same phenomenon is clearly observable in children. As was brought out above they show little fear of animals. If however one animal succeeds in arousing fear, any moving furry animal thereafter may arouse it. In one observed case a child at 180 days had a small dog tossed into its carriage. She became terrified and thereafter showed marked reactions not only to dogs but even to rapid mechanically moving toys. At 600 days she was placed on the floor near her mother and father and two children with whom she had been playing. A very tame white mouse was placed on the floor near her. She watched it for a moment, her lips puckered, she shook slowly from side to side, squirmed, retracted hands and arms, broke into a cry, scrambled to her feet and fell headlong into her father's arms.

The emotional transfers begin very early in life. The following diary of one of the infants under observation in the laboratory is clearly expressive of the process:

Lee, 67, 80 and 87 Days of Age.—When first laid on the couch (where grasping reflex was tested) she would smile and gurgle on all of the above dates, but after testing the grasping reflex, she would cry the moment she was put back on the couch. When picked up she would stop, and when put down she would start to cry. If left on the couch for any length of time, she would stop crying, but if the experimenter approached her or touched her hands with the grasping rod, she would immediately start to cry.

101 Days of Age.—She was laid on the couch by her mother. She gurgled and smiled. The mother then took her up and held her for a few minutes and again put her down. Again she smiled and gurgled. The experimenter then tried out the grasping reflex upon each hand. She cried loudly and struggled. As the experimenter first approached her with the rod to make this test she did not cry, but when the rod was put into her hand she began to whimper and actually cried before lifting was begun. After the test the mother took her up and held her until she became quiet. She was laid down, but immediately began to cry. The mother again took her up and quieted her and put her down with the same result. Repeated, with the same result.

108 Days of Age.—The above conditioned reflex did not carry over completely for the week. When her mother first laid her on the couch she did not cry. She was quite restless however. The first contact of the rod in the left hand caused only a whimper. This became stronger on touching her right hand. She cried outright as soon as the rod was raised and before she had supported very much of her weight.

115 Days of Age.—As soon as the mother was seated with the baby in her lap, the experimenter entered the room and tried to put a piece of candy in her hand (earlier

tests had been made upon the eye-hand coördination). She began immediately to whimper and then to cry. This in all probability was the carrying over of the conditioned reflex, *i. e.*, the visual stimulus of the experimenter was enough to set off the crying reflex.

The fear reactions we see in the dark, in graveyards at night, at lightning, and in many other definite situations, probably belong in the conditioned emotional reaction class. We would put all of the definite phobias (where the reaction is to a definite situation or object) in this class. Such reactions are more numerous in individuals of the unstable emotional type, and especially among frontier and primitive people where every crackling of a twig or cry of an animal or shaking of a bough may be fraught with danger.

Rage, likewise, is capable of being attached now to one object, now to another, in an ever widening series. That is, given an original situation that will arouse rage (page 170), attachments will occur whenever conditions are at hand for the arousal of conditioned reflexes. An individual hampers the use of the child's arms and legs, constrains it, or holds it badly when dressing it, (original condition for arousing rage). Soon the mere sight of that individual arouses the rage components. Finally an entire stranger whose appearance is even slightly similar to that of the first individual may set off the responses.¹

The transfers or conditioning observed in love are seen to best advantage in the psychiatric clinic. However, such substitutions are seen in every day life in profusion. The mother who has lost a child may put the same loving care upon the child's crib, clothing or toys that she would put upon the child itself. The man who has lost his wife may exhibit toward his daughter much of the tender and respectful solicitude that he would shower upon his wife. We shall not attempt to enlarge further upon attachments of this type we see in love, since in recent years the subject has received sufficient attention at the hands of the psychoanalytic school.

¹The conversation of adults often contains such expressions as the following: "I can't stand that person," "I have an instinctive aversion to one who looks like that." A good many such aversions (avoidance reactions) have their roots in such substitutions.

A great many of the so-called transfers we see in love probably belong under the vaguer type of behavior discussed below under 'emotional outlets.'

In general then it seems safe to say that when an emotionally exciting object stimulates the subject simultaneously with one not emotionally exciting, the latter may in time (often after one such joint stimulation) arouse the same emotional reaction as the former. It is probable that conditioned reflexes of the second, third and succeeding orders are also continually arising. In the process, the reaction pattern probably gets broken up to a large extent. Part reactions belonging to love, rage and fear might all appear in the reaction to such a substituted stimulus.

In addition to this sudden type of transfer or substitution which undoubtedly belongs in the class of conditioned reflexes, there are the 'attachments' and 'detachments' to persons, places and things which come by the slow process of association or habit connection. They probably do not differ in origin from the type just considered except for the increased length of time required for their formation.

Emotional Outlets: Diffusion.—On page 168 we spoke of changes in the general level of activity due to emotional disturbance. We spoke there of a normal, of a high and of a low level. Probably if an individual were perfectly balanced, the distribution of emotional activity would be uniform and all organized activity would share equally, *i. e.*, there would be a mere change in level. But few individuals possess that perfect balance which would make this possible. Furthermore society and one's own organization often make emotional outlets impossible along certain lines. When emotional expression is blocked in any one region, outlet seems to take place somewhere else. An illustration will make the point clear: *A* is insulted by a larger man, or by an older or a younger man, or by one from whom he is receiving his daily bread. The instinct and habit organization of *A* would lead to an attack, or at least to its equivalent—a strong verbal retort. But other features in the total situation (the fact that he is larger, older, younger) inhibit these outlets.

The emotional pressure however has been aroused. He may proceed to his office, fire his bookkeeper or office boy or terrorize his stenographer. One's family often suffers most in such cases. If a man's wife causes the emotional rise, the children are apt to suffer. The outlet, however, may not always be a harsh word or a blow. If the emotion partakes of the fear or rage components, the blow or harsh word is most frequent. If the thwarted emotion is of the love type, the final outlet may be exhibited by showering kind words or benefits upon someone other than the person calling out but thwarting the love emotion. If the thwarting is brought about by the death of the loved object, the outlet may be found in grief or suicide.

Human life is full of such outlets. If society as a whole puts on too many restrictions (rage) and the thwarted individual is not well-balanced, the outlet may be through burglary or vandalism. In balanced individuals it may have its outlet through swearing or in privately railing at the restrictions of society.

In certain individuals, either through inferior constitution or the narrowness or restrictiveness of their environment, no external outlet seems to be possible. The emotional drainage expresses itself in some form of attitude (page 186); by withdrawal or shrinkage from contact with fellow humans of any kind; in drink or drugs; in ruminations, day-dreams and air-castles—*i. e.*, there may be an implicit language outlet.

The point which rationalizes and gives a reason for all such behavior seems to be, that the individual by so reacting gets relaxation and freedom from emotional pressure. Popularly we speak of 'working off' the emotion, that 'one's rage is cooled' by this or that. The study of these various outlets when they assume pathological form and interfere with the remaining activities of the individual or with those organized functions which society demands of each individual, and the reshaping of such individuals, belong to psychiatry. We see however the same factors at work even in 'normal' individuals, and our training as psychologists is not complete until we are able to note the signs of emotional maladjustment.

We have not the evidence at hand to affirm the view that all of the phenomena seen in diffusion belong to the conditioned reflex realm. The activity seems to be too little stereotyped and entirely too complex to belong in that category. The attachment is not focalized. Probably the simplest way of stating the generally observed fact is that too great emotional pressure is drained off through whatever channel environmental (social) and hereditary factors make possible.

Consolidation among Emotion, Instinct and Habit; Attitudes.—Observation seems to show that combinations or integrations occur among emotional, instinctive and habit activities. Our discussion of these integrations will be handicapped to some extent by our not having had opportunity to study instinct and habit. Possibly the activities we see in 'anger' or its more active attitude 'fighting' best illustrate the points to be presented. Anger as we see it exhibited in the insect world probably remains on the emotional instinctive level (hereditary). Habit activities are at a minimum in these animals (though not wholly lacking). In the human race certainly the exciting stimulus is usually one which hampers, jostles, crowds or constrains the individual—the stimulus to rage. The instinctive factors are striking out with the arms and hands, grasping, running toward the object, probably biting it, the while unfleshing the lips. Defensive movements also occur of the instinctive kind. The habit factors express themselves in the scientific 'form' of attack and defense: the way the arms are held to avoid giving the enemy an opening, planting the blow on a vulnerable spot—the eyes or the solar plexus, and in the stance of the feet. The whole group is integrated, the part reactions work together. The individual becomes a fighting-defending, unitary action mass. If the environmental factors are such that actual fighting cannot occur, the subject assumes the 'defiant' attitude. All three factors are still present even in the attitude. Many of the emotion, instinct and habit action tendencies are constrained by social factors. The emphasis has then of course to fall back on the emotional component of the action mass.

In the above rage predominated as the emotional constituent, the hereditary attack and defense movement as the instinct and the trained activities as the habitual. Probably all other forms of emotion—those of the native or more fundamental type, as love and fear, and the broken up, combined and consolidated types which we get through substitution—show the types of combination shown above. To attempt to list these, to show their history and formation through the process of substitution and consolidation, would require a volume (and a very necessary one) of its own. Only a few will be touched upon here. The so-called submissive or inferiority attitude shows itself at once as having fear as the most prominent emotional element. The instinctive factor may not be clearly overt, but it is in general. It manifests itself in shrinking, submission and avoiding—sometimes with the body as a whole, sometimes with special organs as the lips and the eyes. The habitual factor shows itself especially in the language behavior of the adult—hastening to agree, avoiding an argument, and the hesitant voice.

In the sphere of love there are numerous attitudes as shown by the popular expressions ‘lovelorn,’ ‘lovesick,’ tenderness and sympathy; more fundamental and prominent attitudes are those of shyness, shame, embarrassment, jealousy, envy, hate, pride, suspicion, resentment, anguish and anxiety. There are many combinations of emotional habit and instinctive factors in all of these attitudes. They actually function by limiting the range of stimuli to which the person is sensitive. For the individual they are fundamental attributes of character, as much a part of him as his arms or legs or his method of attacking a new problem.

This very superficial analysis is not at all commensurate with the rôle these attitudes play in the life of the individual. In studying the life history of any person we can see how they have oftentimes furthered or hindered his life work and disturbed his personal balance. Shyness and the inferiority attitude may keep a man tied all his life to an accustomed, but unremunerative job. They have oftentimes prevented his

marriage or brought about a poorly adjusted marriage or kept him out of a wider social circle. On the other hand, in other cases too much aggressiveness has just as often made impossible a man's chances of making good business and social connections.

Results of the Physiological Study of Emotions. A. Duct Glands and Smooth Muscles.—The recent physiological work upon the duct glands of the mouth and stomach has brought out the fact that when the human or animal subject is under the influence of the stimulus of hunger (rhythmical contractions of stomach muscles) conditioned secretion reflexes occur when food (food positively reacted to) is allowed to stimulate the animal visually or olfactorily.

Under the influence of emotional stimuli these part activities are often blocked. This aspect of the phenomena of secretion and movement of the smooth muscles of the stomach is undoubtedly a part of the physiological study of emotion. A number of observers have shown that emotionally exciting situations do check the functioning of the glands. If a child with a gastric fistula is shown food and is then badgered by first handing it to him and then taking it away and then causing it to disappear from vision, crying and other definite signs of an emotional state appear. The secretions are checked. Similar conditions obtain in the case of dogs: if they are put in strange surroundings or if they are fastened in a holder, or finally if they are shown their natural enemy, the cat, the flow of secretion is checked. If the emotional state is long continued, in both man and animals even the unconditioned reflexes may fail for some time, *i. e.*, the actual contact of the substance may fail to arouse the flow of the gastric juices.

A similar phenomenon appears in connection with the peristaltic movements of the stomach, and indeed of the movements on the muscular layer of the whole alimentary canal. Restraining the animal, covering its mouth and nose with the finger, check the stomach contractions very quickly. But we have just seen that stimuli of this kind produce the emotion of rage. The same phenomena appear

in the case of man. People under the influence of fear and rage frequently do not digest their food (due to the checking of secretion) and the food remains in the stomach (due to lack of movements necessary to pass the contents of the canal along).

Excitation of the pain receptors has the same effect as emotional disturbance (probably is a stimulus to rage) both upon secretion and upon the stomach contractions. It is probable that any of the highly exciting emotions act in the same way as those discussed above. Sex emotions aroused by salacious photographs, and pictures, have a definite inhibitory effect upon the rate and amount of secretion of the parotid gland and upon certain reflexes (swallowing).

B. Effect of Exciting Stimuli upon the Ductless Glands.— Apparently one of the most important effects that emotional stimuli exert is the release of adrenin. The adrenin in turn liberates sugar from the stored supply in the liver, often in amounts greater than the body can consume. Glycosuria results, *i. e.*, the excess sugar passes over into the urine. This phenomenon often occurs in battle and in extreme emotional situations of any kind (depressing or exciting). Cannon states that young male cats when fastened in a holder become quite frantic, with eyes wide open and pupils dilated; the pulse is accelerated and the hairs of the tail become more or less erect; they snarl and growl as they try to free themselves. Whenever this excited condition occurs there is glycosuria (in from forty minutes to an hour and a half). When a small dog is allowed to bark at the cats, causing them to become excited, the glycosuria manifests itself. Similar results occur in the case of the human being. After hard examinations or exciting athletic contests, students show temporary glycosuria.

When glycosuria occurs, it is an indication of an increased supply of sugar in the blood, since so long as the kidneys are uninjured sugar cannot pass out into the urine until an excessive supply of sugar is at hand. Testing for sugar in the urine is really a very coarse method of detecting the emotional effect of a stimulus. Recently very sensitive

methods have been discovered for detecting the presence of increase of sugar in the blood. A large amount of material has collected in our laboratory as the result of blood sugar tests. It is unquestionably a very delicate indicator and revealer of emotional changes. It has been used in connection with the association word reaction method. This method may be operated as follows: One individual does a certain act and a second individual remains quietly in another room. The two return to the experimental room and the experimenter must decide from the word responses (hesitations, etc.) which one of the individuals performed the act in question. A small amount (few drops) of blood is obtained from both individuals both before the test is made and after and the percentage of blood sugar determined in all four specimens. The individual having committed the 'crime' shows as a result the greater increase in blood sugar. The blood sugar reaction can thus be used as a supplementary method of detecting 'guilt.'

The method is probably delicate enough to decide whether a given individual is emotionally aroused by the mere presence of another individual. These results were obtained by Dr. N. D. C. Lewis. They have not yet been published. It has been shown conclusively that if the adrenal glands are removed emotional stimuli will not cause this increase in sugar either in the blood or in the urine (Cannon and others). The conclusion is well sustained then that emotional stimuli through a reflex mechanism set free adrenin which in turn acts upon the supply of sugar in the liver and converts it into a form which can be used by the muscles after it gets into the blood stream.

In addition to its sugar conversion effect upon the liver, adrenin acts in conjunction with the sympathetic nerves and produces vaso-constriction and hence an increased blood pressure. It has been shown that when a given muscle is active, its blood vessels dilate, thus tending to decrease arterial pressure. If many muscles are called into action at any given moment, these dilated vessels may so reduce arterial pressure that the muscles fail to get their proper food.

Waste products also accumulate in the muscles. Adrenin because of its reinforcing effect upon the vaso-constrictor nerves produces heightened arterial pressure, which increases the food supply to the muscle and removes waste products. The blood is driven out of the vegetative organs of the interior into the skeletal muscles, which have to meet the extra demand when the animal is fighting and struggling to free itself.

C. Specific Effect of Adrenin.—There seems to be general agreement that the free adrenin in the blood acts directly upon the muscle in such a way as to neutralize fatigue products. "What rest will do only after an hour or more, adrenin will do in five minutes or less" (Cannon). This result is in addition to adrenin's function in producing a greater food supply to the muscle and increasing the amount of blood circulating through the muscle. After a muscle has been fatigued, *i. e.*, has lost its irritability, the injection of adrenin into the blood (or stimulation of the splanchnic nerve) will rapidly restore the muscle to its resting condition. Cannon also maintains that the presence of adrenin hastens clotting of the blood, which in wounded animals might be advantageous. His results in this respect have not been confirmed by other physiologists.

Apparent Conflict between Formulations.—There seems to be a conflict between our early statements about emotion and those gathered from the physiological studies just reported. We first expressed the view that if the emotional stimulus was strong enough or continued for a sufficient length of time paralysis or the death feint would occur. The state attained here is surely not adaptive. The result of the physiological study seemed to show that the organism under the influence of exciting stimuli often takes on a bettered state, one in which greater muscular activity and less fatigue is possible. The conflict can be harmonized. The 'improved' physiological state is apparently due to the action of the autacoid substances. Physiologists have shown that such substances act like drugs. If a small amount of a certain drug, say strychnine, is administered, increased

appetite and increased muscular activity ensue. A bettered general physiological condition may result. On the other hand, if too large an amount is given, the muscles may become rigid and the subject may die. Possibly a similar thing happens in the case of the autacoids. If the substances are set free in too large amounts, there is one type of action, namely, the paralyzing effect. If set free in physiologically serviceable amounts, their action may produce a combined series of reflexes, the total result of which may be a bettered physiological state.

The physiologists have unquestionably overemphasized the adaptive character in all of the major emotions. From Cannon's work it is easy to see how under the emotions of rage, fear and pain stimulation, the possibility of increased muscular effort might be of value, as in fighting, flight, etc. On the other hand it is difficult to see how this physiological state is of value unless the organism is in a situation where the increased muscular possibilities are to be used, but such situations are rare. A soldier in the army receives a letter telling him that his wife has gone off with another man. The news is undoubtedly a strong stimulus; depression takes place and examination shows the presence of sugar in the urine, and naturally an increased supply in the blood, but his routine of camp activity happens to be such that no great muscular demand is made upon him. We may grant Cannon's general position and yet maintain that it is not a very serviceable concept for the ordinary routine of daily life. We are no longer living in a frontier country, and outside of an occasional war, there is not much opportunity to bare our teeth and struggle for existence in the good old primitive way of our ancestors. Cannon's appeal to the biological serviceableness of the emotional reaction needs modification.

There would seem to be no question, but that the immediate effect of the exciting stimuli upon organized activity, as was brought out on page 166, is always disruptive. If an individual is preparing a lecture or writing a book or rendering a musical selection, any strong emotional stimulus at least temporarily disrupts and blocks the organized activity.

The same thing would occur if a group of officers were preparing plans to make an attack on the enemy the following day, and a shell were to burst and tear down a portion of the building in which they were working. It would thus seem necessary to state that the immediate effect of an exciting stimulus is unadaptive, disassociative and disruptive. The immediate effect may endure for an extremely short time, or for a longer time. We have found that the increased sugar in the blood may endure for several hours even after fairly slight emotional stimulation. There is thus a post-shock or post-emotional state. Apparently the post-emotional state may be of such a character that (1) the organism is left less well adjusted and less capable of carrying out organized activities. As an example of this, the death of a child may leave the mother in a depressed and apathetic condition which may endure for months. On the other hand (2) the post-emotional state may be of such a character that the organism is in a bettered physiological state; the activities going on before the emotional stimulus appeared may be resumed under a condition of facilitation and reinforcement. An example of this occurs when a parent punishes a child: there may be immediate improvement noticeable in his whole behavior (but the reverse may also happen; the child may be thrown into a sullen state which might endure for some time). As a less ambiguous example, take the case of an individual working at a low ebb. He receives a letter containing a check which, while it blocks his activity for the moment, has as its post-emotional effect a tremendous influence upon the speed and accuracy of his work for the remainder of the day or even for a longer period. In general we may assume that the effect of an emotion arousing stimulus upon the general level of activity may produce facilitation or the reverse; or it may leave the level unchanged.¹ What result will occur depends

¹ We are in genuine need of some experimental work of a detailed character upon the efficiency of the human organism in the post-emotional state: (1) of the ergographic type of experiment, (2) of the word association type, (3) of the learning type, (4) of the functioning of already well established activities such as typewriting (explicit motor), and (5) of the sub-vocal arithmetic type (well established implicit laryngeal motor habit). The work of H. T. Moore which was called to the writer's notice after the preparation of this paper in part supplies this need.

upon a great many factors: The nature of the exciting stimulus, the individual's character, his general bodily state, etc.

Rôle of Emotion in Daily Life.—The main fact about emotion seems to be that the human organism is built to react in emotional ways. We stated in the beginning that they are inherited modes of action. Consequently it is not incumbent upon us as psychologists to give any detailed statement as to their biological serviceableness in keeping the race alive. We should be content with describing the facts and pointing out the rôle that emotion plays in our development and in our daily life. Of course if one is terribly overawed by Darwin, one cannot react until one has pointed out in detail the utilitarian value of every reaction. We are inclined to believe that in both instinct and emotion there are many part reactions which are of no adaptive value to the organism whatsoever: if the organism possesses enough hereditary structures and modes of reaction to enable it to get along in its environment, the process of evolution (selection or elimination) allows it to possess many luxuries in the way of reaction possibilities.

We do not mean to assume by these precautionary remarks that emotions are without significance in daily life. We would emphasize the point that they can and do exist whether they are *always* useful, or useful only at times. (1) Even though they were mere luxuries, so far as biological fitness is concerned, they serve to remove the individual from the monotonous level of existing as a highly perfected biological machine. They give him his ups and downs, make the exact prediction of his acts more difficult (troubling the psychologist and psychiatrist thereby), and in general make him a more delightful personality with whom to work, fight and play. (2) As regards their effect upon the possibilities of the achievement of the individual, we are inclined to agree with William James in his 'Energies of Men' that in very exceptional cases, the heightened state which comes *after* a great emotional crisis may bring about a degree of achievement that could not be dreamed of at the ordinary working level of the individual—Poe, De Quincey, Byron, Goethe

and George Sand would probably never have produced their masterpieces under a humdrum regime. One can take selected cases and marshall an imposing array of such instances. On the other hand, one must preserve one's balance in making the assumption that because a few geniuses have produced great works under heightened emotional tension, such exalted states make for or produce genius. The point seems to be that occasionally under a great tension all part reactions hang together and mutually facilitate one another—every asset and every resource of the individual as long as the effect of the emotional state persists are marshalled for the work in hand. Such occasions are rare. The next emotional shock might as its after effect leave the individual trembling, enervated and flat; totally incapable of accomplishing anything except the merest routine. We all know from our own diaries of ourselves that under ordinary circumstances if we have a fine piece of work to do, a championship game to play, a delicate piece of apparatus to manipulate, a fine surgical operation to perform, we would not willingly expose ourselves to any strong emotional situation; and yet the brilliancy of our performance might be increased thereby. Certainly in history such achievements have been accomplished under such conditions. Possibly the sheltering which comes from civilization has built up an attitude of timidity, thereby lessening our readiness to take the chances which our predecessors had to take. Society more and more guards against the presence of strong emotional stimuli, since the weak and possibly even the individual of average ability cannot withstand their effects, however well the genius may thrive under their influence.

It is true that the illustrations in which we see the bad effects of emotional shock have been chosen from activities that demand the fine coöordinations of delicate muscles. Would the case be different with more constructive activities? Would the plan of a great novel, the writing of a beautiful poem, the painting of a masterpiece, the composition of a great opera be facilitated, or the reverse, by producing in the artist some great emotion? The history of art apparently returns an

affirmative answer. (3) In observing the daily life of a great many individuals, we seem to see the following factors at work: One individual has reached a low level of adjustment; he can typewrite so many words a minute, or telegraph so many words a minute, or make so many entries in his journal. If this low level of adjustment gives the individual his daily bread, he does not depart from it. His social relations at home and on the outside are on the same dead level. His emotional attitudes are stereotyped: One takes the attitude of suffering at everything; another the religious attitude; still another the hard-done-by and the downtrodden attitude. There seems to be a wall around these people. Is there no way of breaking through this wall and getting the individual to reach a higher level of achievement? Emotionally exciting stimuli occasionally seem to accomplish it. The sudden accession of responsibility or wealth; the enforced demands which come with marriage and the rearing of a family; sometimes even a strong rage or fear may break through the stereotyped and habitual mode of response and arouse the individual to the point where he can accept and profit by intensive training (acquisition of greater skill in his field) and eliminate his errors, work longer hours, and plan his work in a more systematic manner.

A CLASSIFICATION OF REFLEXES, INSTINCTS, AND EMOTIONAL PHENOMENA

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The problem of classifying human reflexes, instincts, and phenomena of the affective mental life arose in connection with a projected text on *Human Psychology*. The literature on reflexes proved disappointingly meager and unsystematic. Nowhere in the works consulted was there found a systematic classification of the human reflexes. Physiologists emphasize a few reflexes—notably the scratch and tail-wagging, which are not germane to the present inquiry; the rest are mentioned more or less casually.

The instincts and emotions have received better treatment. Under the inspiration of James several psychologists (notably Ribot, Thorndike, Angell, and McDougall) have listed and discussed both types of phenomena very fully. If criticism of their work may be offered it is that the instincts, and consequently the emotions also, have not been traced back to distinctive sources in the vital organic processes.

I. REFLEXES.—In making the classification of reflexes (Table I.) the procedure was wholly empirical. The literature was examined carefully. James's list of emotions was found to include many simple activities, such as biting, which are more properly classed as reflexes. Gould's *Medical Dictionary* contains a full list of diagnostic reflexes. The various muscles and parts of the body were examined for additional data. (Note the anomaly of the common term, 'pupillary reflex'!) Observation of self and others was practiced for some time to complete the list; shuddering and starting were added in this way. In some cases it was found impracticable to list the reflexes separately; thus a large group of distinct phenomena are listed together as 'myenteric reflexes.' Introspective evidence was used to determine the

TABLE I

HUMAN REFLEXES

A. Purest—Least Subject to Central Modification in Adult

"Pupillary" or iris reflex	Snoring
Ear twitching (controlled in some individuals)	Shuddering
Equilibration	Starting (to sudden noise, etc.)
Hand withdrawal (to heat and pain)	Trembling
Myenteric reflexes (operation of stomach and intestinal muscles in digestion)	Rhythmic contractions (in epilepsy, paroxysmal agitans, etc.)

B. Largely Pure—Subject to Inhibition or Reinforcement

Winking	Hand twitching (to dermal pain)
Accommodation, ciliary reflex	Plantar reflex (to stimulus on sole of foot)
Eye-fixation and convergence	Great toe reflex
Hiccoughing	Vasomotor changes (blushing, etc.)
Sneezing	Breathing changes (to specific stimuli and to onset of sleep)
Patellar reflex (knee-jerk)	Groaning
Dizziness reflexes	Laughing
Yawning	Cramp movements
Vomiting	Shivering
Facial reflexes (to bitter taste, etc.)	Squirming
Salivation	
Tickle reflexes	

C. Occasionally Pure, more often Centrally Modified

Coughing	Smiling
Swallowing and gulping	Wincing, etc.
Visceral discharge, etc.	Stretching
Functioning of sex organs	Convulsive contractions (to deep pressure and heat, to pricking and other dermal pains, and to visceral pain)
Nasal reflexes	
Gasping	
Weeping	
Sobbing	

D. Pure in Infancy, Centrally Modified in the Adult

Sucking	Tugging (wrist reflexes)
Biting	Clasping (elbow reflexes)
Spitting	Reaching (shoulder reflexes)
Hunger and thirst reflexes	Kicking (gluteal reflexes)
Vocal reflexes	Stepping (toe and ankle reflexes)
Reflexes to odors	Jumping (ankle reflexes)
Turning the head	Sitting up
Grasping (finger reflexes)	Bending forward
Tossing (elbow reflex)	Rising

E. Posture Reflexes

Holding head erect	Standing
Sitting	

extent of central or voluntary control to which each reflex is subject in the adult.

TABLE II
HUMAN INSTINCTS

1. Nutritive	2. Reproductive
Metabolic expressions	Mating (sexual attraction, courtship)
Walking	Maternal
Feeding	Filial (of infancy)
Wandering [Hunting]	
Acquiring [Hoarding]	
Cleanliness	
3. Defensive	4. Aggressive
Flight	Fighting
Subjection	Resenting
Hiding	Domineering
Avoiding	Rivalry
Modesty [Shyness]	
Clothing [Covering]	
Constructing [Home-making]	
5. Social Organization	
	Family (parental and filial)
	Tribal [Gregarious]
	'Apopathetic'
	Sympathetic
	Antipathetic
	Coöperating

2. INSTINCTS.—The evolution of the various instincts may be traced to the adjustment of relations between the organism and its environment. Some of the vital processes, such as organization, growth, and regulation, do not seem to have led to the evolution of any specific instinct. Other processes, such as *nutrition* and *reproduction*, are accomplished in part by reflex and instinctive activity. Furthermore, the general relations between the creature and his environment have led to certain types of instinct, which may be classed as *defensive* and *aggressive*. The social relations of mankind yield an additional group—the instincts of *social organization*. These five classes were adopted as bases of the present classification.

The method used in preparing the list of instincts (Table II.) was as follows:

1. The available lists were compared and duplicates rejected, the most appropriate term among alternatives being selected.
2. The terms so obtained were classed under the five headings.
3. Other instincts were noted empirically, from a study of human life-activities, and assigned to the appropriate class.
4. The terminology was critically revised by consulting lists of synonyms, such as Roget's *Thesaurus*, the aim being to adopt the most representative term in everyday use. Later the terms were still further revised to differentiate as nearly as possible according to general usage between instincts and emotions.

The aim in this and the following lists was to include only well differentiated phenomena. In a few cases important variants are given, but the finer shades are intentionally excluded. Primitive types of instincts are given in brackets after the more developed form; *e. g.*, wandering [hunting]. The term *apopathetic* is used to designate social instincts which occur as responses to the presence and attitudes of others, where the character of the action is neither sympathetic nor antipathetic (see Thorndike, *Educational Psychology*, ch. 3).

TABLE III
INSTINCTIVE TENDENCIES OF MAN

Imitation	Dexterity (right-handedness)
Play	Esthetic expression
Curiosity	Communication

3. INSTINCTIVE TENDENCIES.—Instinctive tendencies (Table III.) were distinguished from instincts proper with reference to their reflex composition. An instinct was defined as a grouping of certain reflexes which vary in kind and degree according to variations in stimulation. An instinctive tendency, on the other hand, offers all sorts of different expressive manifestations. It includes a great variety of reflexes, and its unity as a separate class is apparent only through a broad general conception of the creature's life-

activities. Thus curiosity and play find most varied forms of expression. They do not constitute instincts under the definition here adopted; but they do represent typical forms of instinctive activity. Each constitutes a separate type of instinctive tendency.

TABLE IV
HUMAN EMOTIONS

1. Expressive (Nutritive)		2. Reproductive	
Emotion	Basis	Emotion	Instinct
+Joy (Enthusiasm)	Diffused feeling	+Love	Mating
-Grief (Despair)	"	+Lust	"
-Shock	"	-Coyness	" (female)
+Mirth	"	-Jealousy	" (male)
+Ecstasy	"	+Tenderness	Maternal
Restiveness	"		
Exuberance	Play		
+Wonder	Curiosity		
3. Defensive		4. Aggressive	
Emotion	Instinct	Emotion	Instinct
-Fear	Flight and Hiding	-Anger (Passion)	Fighting
-Disgust	Avoiding	-Hatred	Resenting
-Timidity (Embarrassment)	Shyness	-Envy	Rivalry
-Shame	Covering	+Pride	Domineering
+Awe	Subjection	+Exultation	"
5. Social		6. With Temporal Projection	
Emotion	Instinct	Retrospective Reference:	
+Affection	Family	-Regret (Remorse)	
+Cordiality	Gregarious	+Satisfaction (Elation)	
-Pity	Sympathetic	Surprise	
+Gratitude	"	Prospective Reference:	
+Admiration	"	+Hope	
-Detestation	Antipathetic	-Dread	
-Revenge	"	Anxiety	
-Suspicion	"		
-Scorn	"		

4. EMOTIONS.—The method used in preparing the list of emotions (Table IV.) was generally the same as for instincts, with one additional step: Before the terminological revision the various terms suggested were tested introspectively to determine whether they represent (and call up) a true emotional experience.

The classification of emotions into pleasant (+) and unpleasant (-) was obtained by introspective examination. Introspection was also used in choosing between synonyms. It may be mentioned that Roget's manual was found exceedingly helpful in the revision of terms, though it proved of no value whatever in filling out the lists.

TABLE V
HUMAN DISPOSITIONS

1. Expressive		2. Reproductive	
Attitude	Emotion	Attitude	Emotion
Cheerful	Joy	Affectionate	Love
Despondent	Grief	Lascivious	Lust
Dazed	Shock	Jealous	Jealousy
Frivolous	Mirth	Motherly	Tenderness
Zealous	Ecstasy		
Erratic	Restiveness		
Romantic	Exuberance		
Devout	Wonder		
3. Defensive		4. Aggressive	
Cowardly	Fear	Hostile	Anger
Courageous	"	Vindictive	Hatred
Of Aversion	Disgust	Malicious	Envy
Cautious	Timidity	Ambitious	Pride
Reserved	Shame	Arrogant	"
Servile	Awe	Bold	Exultation
5. Social		6. Instinctive and Sentimental	
Devoted	Affection	Attitude	Basis
Friendly	Cordiality	Miserly	Acquiring instinct
Compassionate	Pity	(Avaricious)	
Of Attachment }	{ Gratitude	Orderly	Cleanliness
Loyal }	{ Admiration	Nomadic	Wandering instinct
Antagonistic	Detestation		
Sullen	Revenge	Credulous	Belief
Distrustful	Suspicion	Skeptical	Disbelief
Supercilious	Scorn	Perplexed	Doubt
		Biased	Belief and Disbelief

5. DISPOSITIONS.—The emotional attitudes, or dispositions (Table V.), were derived directly from the emotions. Here the test by self-observation and observation of attitudes in others proved the most important part of the work. The indefiniteness of popular language and variations in common usage made the selection of terms in this field somewhat

arbitrary. Thus it may easily be asserted that the term *friendliness* represents more nearly an emotional state, and *cordiality* the corresponding disposition. In doubtful cases the writer was guided by his own 'feel' of the connotation of each term.

The three correlated groups—instincts, emotions, and dispositions—were critically compared with one another, and with other mental phenomena, which resulted in adding certain data to the lists. Thus the emotion of wonder appears to be derived not from an instinct but from the instinctive tendency of curiosity; the retrospective emotion of regret is differentiated by the memory coefficient in imagination and thought. Certain dispositions (such as avarice) appear to be traceable directly to instincts (the acquiring instinct), with no mediating emotion. Others (such as credulity and perplexity) are derived not from emotions but from sentiments.

So far as vocabulary and usage permit, instincts have been designated by present participles, emotions by nouns, and dispositions by adjectives.

The tendency to a cut-and-dried logical scheme was challenged to the utmost. It was recognized that certain instincts may not lead to corresponding emotions and that in some cases an instinct may give rise to two or more distinct emotions, or an emotion to several dispositions. The order of importance may be quite different in the three groups.

No attempt was made to connect the instincts with specific reflexes. The writer recognizes the extreme importance of this step in working out a systematic behavior psychology—or in any 'general' psychology, for that matter. But the problem requires a mass of experimental research, which no single laboratory can hope to accomplish alone.

The tables are offered for comment and criticism and as a possible working basis for future investigation. The opinion may be ventured that *no* satisfactory catalogue of the emotions and dispositions will be reached till we are able to measure qualitatively and quantitatively the various secretory processes and metabolic changes which occur in the human system. That this goal lies far ahead may readily be admitted.

AFFECTIVE PSYCHOLOGY IN ANCIENT WRITERS AFTER ARISTOTLE

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Psychological interest in ancient doctrines of the affections—using the term broadly to denote what are popularly called the feelings, including emotions—naturally attaches chiefly to the teachings of Plato and Aristotle. Plato's doctrines of pain and pleasure as respectively disturbance and restoration of organic equilibrium, or, again, as phenomena of want and replenishment, and Aristotle's doctrine of pleasure as the concomitant and completion of unimpeded activity 'like the bloom on youth,' are among the most important contributions of antiquity to theory in this branch of psychology; their influence is traceable through all the centuries and is still potent. Similarly the significance of Aristotle's treatment of the emotions is evident in the extent to which the descriptive psychology of these and cognate phenomena, in aiming mainly at precise definitions and delimitations, has followed his model. Moreover, it is in the earlier period that we find the first broad outlines of a biological theory relating affective phenomena to organic welfare and the first beginnings of the attempt to connect them definitely with bodily conditions. Nevertheless, to the historical student, the discussions in this field in the post-Aristotelian schools are far from negligible. To begin with, there is no subject in psychology on which more came to be written. The direction taken by philosophy, which now seeks, characteristically, to find for the individual a way to happiness and security of soul in the midst of a changing and troubled world, brought with it an increased interest in his pleasures, pains and so-called passions. In literary output the lead is taken by the Stoics. Treatises on the passions are ascribed to Zeno, Chrysippus, Posidonius, Hecato, Herillus, Sphærus. Cleanthes wrote one on pleasure.

Dionysius Heracleota also wrote one on pleasure in four books and another in two books on freedom from passion (*περὶ ἀπαθείας*). Seneca composed a treatise in three books on the single passion of anger. All the Stoics deal with the passions in their ethics. Indirectly also they contributed largely to the discussion by arousing opposition. The principal controversy turned on the question whether the passions were, or were not, 'contrary to nature.' The Stoics—to speak broadly—said that they were and should therefore be extirpated; the Peripatetics denied this and required only that they should be controlled. Here, as throughout the ancient period, and, for that matter, throughout every period, the motive underlying the examination of the affections is practical. In post-Aristotelian philosophy the ethical interest, and along with this the religious, is everywhere paramount. The primary question relates to the worth and place of the affections in an ideal scheme of life; it is for the sake of this alone that any enquiry is undertaken as to their nature and conditions. This interest vitiates the scientific analysis and perplexes the psychological theory. But, in spite of this, an advance is made in several directions. The complexities of the phenomena are more fully realized; distinctions are recognized that had previously been overlooked; new aspects of mental life are brought to light in respect to the attitude the mind is capable of taking towards its affections; some new views are developed regarding their function; now for the first time a serious attempt is made to classify them; and the connections of the affections with the bodily processes, if not more satisfactorily explained than heretofore in detail, are in some respects more precisely conceived in theory.

An illustration of this advance may be found in the Epicurean doctrine of pleasure. Regarding pleasure as an affection proper to the animal nature and pain as alien thereto, Epicurus agreed with Aristippus, the founder of ancient hedonism, in holding that all pleasure is good and that to attain the greatest amount of pleasure is the supreme aim of life. But he observed, as bearing on this question of the greatest amount, what seemed to him an important difference

among pleasures. Admitting that all pleasures are alike in intrinsic quality, as pleasures, he called attention to the fact that they are not all alike in intensity or durability. Some are intense, but transitory, others tranquil, but more lasting. Aristippus, followed by Plato, had made all pleasure consist in motion. Epicurus finds two distinct kinds of pleasure; one consists in motion (*ἡ κατὰ κίνησιν*), but one is a state of rest (*ἡ καταστηματική*). To the former he reckoned bodily pleasures and the more boisterous emotions, to the latter the calmer pleasures of the mind.¹ This distinction is of the utmost importance for him in its bearing on the question of the best life. The Cyrenaics held that bodily pains were worse and bodily pleasures greater than mental. Epicurus maintains the opposite. He notes, in the first place, what Plato had made the basis of his condemnation of (bodily) pleasure as illusory, the contrast-effects in the experience of the bodily affections as tending to diminish the force of the argument for their intrinsic intensities. He notes, further, a difference in the time-relations of bodily and mental affections; bodily pain, he says, is acute, but transient, whereas the mind feels grief with reference not only to the present, but also to the past and future. And similarly of pleasures.² The mental, therefore, possesses the wider range as well as the greater independence. But his main argument against the Cyrenaics is derived from considerations regarding the varying relations of pleasure, pain and desire. Desire is want and want is painful; abolish or moderate the desire and you therewith abolish or moderate the pain. Now if pain is taken away we rejoice though no bodily pleasure follows, while if pleasure is removed, pain does not necessarily follow.³ Again, it is only when we are pained at the absence of pleasure that we feel the need of pleasure, but when we feel no pain, we no longer need pleasure.⁴ Herein lies the condemnation of unnecessary and inordinate desires. Desires which, if unsatisfied, do not lead to pain are unnecessary; if, on the other

¹ Diog. Laert., X., 136.

² *Ibid.*, 140.

³ Cic., 'de fin.', I., 56.

⁴ Diog. Laert., 128.

hand, the natural desires, failure to satisfy which is painful, are violent and obstinate, that is sure proof that they are mixed with false opinion.¹ All this points to an ideal of felicity conceived as consisting in freedom from pain and intemperate desire and all disturbing affections of the soul. This is the famous Epicurean imperturbability (*ἀραραξία*). "By pleasure," writes Epicurus in a letter to Menoeceus, "we mean the absence of pain in the body and trouble in the soul. It is not an unbroken succession of drinking feasts and of revelry, not sexual love, not the enjoyment of fish and other delicacies of a luxurious table that produce a pleasant life; it is sober reasoning, searching out the grounds of every choice and avoidance, and banishing those beliefs through which the greatest tumults take possession of the soul."² Such pleasure is unaffected by time; infinite and finite time both have equal pleasure, if we measure the magnitude of pleasure by reason; the man who has found the true happiness would not have that happiness increased though he lived forever. Nor is it added to by the pleasures of the flesh; it is only diversified.³

The psychological significance of this teaching lies not in its attempt to measure the quantity of one kind of pleasure as compared with another, nor in its attempt to fix the limit to the variations of pleasure in intensity; it lies rather in its suggestion of a sort of generalized pleasure consisting in a habit or frame of mind. Aristippus had made the best life consist in a sum of pleasures strung along in a series; according to Epicurus it is not found in any sum or succession of pleasures, but in a stable disposition of soul which meets with the same cheerful serenity all the vicissitudes of life. This disposition is moulded by philosophy. Particularly interesting is the psychology involved in a famous application of this teaching. "Even in the hour of death, when ushered out of existence by circumstances, the mind does not fail to enjoy the best life," writes Epicurus; even if the wise man were put

¹ *Ibid.*, 149f. Maxims 30-32.

² *Ibid.*, 131f. Letter to Menoeceus, transl. by R. D. Hicks, 'Stoic and Epicurean,' p. 172.

³ Diog. Laert., 144f. Maxims 17, 19.

to the torture, he would still be happy.¹ Even in the bull of Phalaris, Cicero quotes him as saying, the wise man would exclaim, How sweet, how indifferent this is to me!² Something of this Epicurus himself claims to have experienced. Writing to a friend from his death-bed, he tells him that the disease—the acutely painful malady of renal calculus—had reached its height, but it is all outweighed, he says, by the mental pleasure derived from the memory of a life devoted to philosophy.³ It is easy to accuse him of exaggeration, the doctrine at least is plain: the mind, habituated to reflection, has the power, by voluntarily dwelling on the memories of past pleasures, of detaching itself from present ills and thrusting them aside. As, according to another Epicurean doctrine, vulgar fears produce all manner of disturbances in the body and are only to be eradicated by enlightenment, so contrariwise the pains of the body may be surmounted and suppressed by the tranquil soul: the sage can enjoy felicity even on the rack. Cicero and others found in this doctrine a subject of pleasantry; modern psychology, better acquainted with the facts, is disposed to admit the experience among the possibilities of suggestion and the affective imagination.⁴ We shall meet with a similar doctrine in the Stoics and in Plotinus, the latter of whom speaks for the mystics generally.

Regarding the physical basis and bodily symptoms of the affections Epicurus has nothing to say worth recording. He thought of the soul as an assemblage of atoms within the body, the irrational part distributed throughout the body, the rational more especially in the chest;⁵ and this perhaps made it possible for him to conceive of the mind as rationally affected apart from the participation of the rest of the body. Lucretius gives a vivid description of the more striking symptoms of fear and anger, but his explanations do not go beyond a superficial use of the recognized Hippocratean principles.

¹ *Ibid.*, 118.

² 'Tusc. Disp.', II., 7.

³ Usener, 'Epicurea,' p. 143.

⁴ See V. Brochard, 'La morale d'Épicure,' *L'Année philos.*, 1903, pp. 8-12; cf. F. Pillon, 'Sur l'imagination affective,' *Rev. Philos.*, 1907, 63, pp. 240 ff.

⁵ Diog. Laert., X., 66.

Of the other doctrines of Epicurus about the affections, the best known is that which places them among the criteria of truth; but this appears to amount only to the assertion that their presence points to a corresponding object to be approached or shunned. Less well known, but more significant, is his contribution to the theory of the origin of language, a subject in which the Greeks had for some time shown a lively interest. Was language 'natural' or 'conventional'? The question is discussed at length by Plato in the *Cratylus*. The view of Epicurus was that "the names of things were not originally due to convention, but in several tribes under the influence of special feelings and special presentations of sense primitive man uttered cries. The air thus emitted was moulded by their individual feelings or sense-presentations and differently according to the differences in the regions which the tribes inhabited. Subsequently whole tribes adopted their own special names" for convenience of communication.¹ This vague anticipation of modern teaching is in principle as far as any ancient writer on the subject ever went, but we do not know how far Epicurus carried it out, if at all, in detail.

We turn now to the Stoics. The peculiar theme of the Stoics is the passions. In reporting their doctrines it is even less possible than elsewhere to keep the psychological aspects free from the ethical, for a condemnation of the 'passions' is contained in their very definition. A 'passion,' namely, was defined, in general, as a perturbation of soul (*πτολα ψυχής*) which consisted in an excessive or overpowering impulse (*δρμή πλεονάζουσα, ἐκφερομένη*), such movement or process being irrational or insubordinate to reason (*ἀλογος, ἀπειθής λογώ*) and contrary to nature (*παρὰ φύσιν*).² It is a phenomenon of unregulated impulse. That it was irrational and contrary to nature was implied in the Stoic conception of reason and nature, for this—the two are one—allowed of no excess.

¹ *Ibid.*, 75, Letter to Herodotus, transl. by Hicks, *op. cit.*, p. 275.

² Stob., 'Ecl.' II., 7, 1, p. 39. 5 W (quoting from Zeno); 7, 2, p. 44, 4; Clem. Alex., 'Strom.', II., p. 460, Pott.; Diog. L., VII., 110; Cic., 'Tusc. D.', IV., II, 47. Cf. Aspasius in 'Arist. E. N.', p. 44, 12. Heylb., δρμήν σφοδράν ή δρμήν δλογον, λαμβάνοντες τὸ δεναρτίον τῷ δρμῷ λογῷ.

The term here translated impulse (*δρμή*) nearly corresponds in the Stoic terminology to what Aristotle called *σρεξις* (which the Stoics made a species of *δρμή*) denoting all instinctive tendencies to action. In itself it is necessary, normal and natural.¹ But 'passion' is by definition excessive impulse, one not conformed to the natural ends of life, but a movement by which the subject of it is violently carried away. Hence it is contrary to that Logos, that rational order, or principle of order, which the Stoics regarded as constitutive of 'nature' generally and as the essence of reason in the conscious mind. A life according to nature or reason, they conceived, was free from its disturbance. The word by which they designated this freedom—'apathy' (*ἀπάθεια*)—must not be taken to mean what we mean by the term; it does not mean a pathological state devoid of all feeling. It meant rather a settled state of freedom from the perturbations which prevent the exercise of the normal functions in fulfilling the rational aims of human living. 'Apathy' is, therefore, not itself the end, but the negative condition of its attainment.

The question at issue between the Stoics and their opponents was not whether such perturbations were evil and freedom from them good, but whether the disturbances which they named as such—anger, fear, love, hate, etc.—were of such a nature that in order to the best life every disposition to these affections must be, as they held, eradicated, or whether by suitable discipline they might not be converted into occasions of virtue. The Stoic view was that the soul which is subject to 'passions' is in a condition of weakness, is lacking in *tone*. The 'passions' are diseases of the soul analogous to those of the body, and like the latter may be distinguished as to constitutional morbid propensity, the state of disease itself, and the incidental sickness or infirmity.² Freed from the 'passions' the soul is all strength, force, tone

¹ 'Schol. ad Lucian,' Jacobitz IV., p. 211, δρμής μὲν κυνηγικά δσα κατὰ φύσιν. Stob., 'Ecl.' II., 160, 162, φορὰ ψυχῆς ἐπὶ τι τῶν ἐν τῷ πράττειν, φορὰ διανοίας, quoted by Chaignet, 'Hist. de la psychol. des Grecs,' II., 140f. Cf. Cic., 'de fin.', III., 16ff.

² On the distinction of *ένεμπτωτα*, *νόσημα* and *ἀρρώστημα*, see Stob., 'Ecl.' II., 93, 1; Diog. L., VII., 115; Cic., 'Tusc. D.', IV., 12, 13, 26.

(*ισχύς, κράτος, τόνος*), in good tone (*εὐτονία*), mistress of itself (*έγκράτεια*).¹

That the condemnation of the 'passions' did not involve the repudiation of every affection is seen in the admission by the Stoics of a class of 'good affections' (*εὐπαθεῖαι*, Cic., *constantiae*). They included under this term cheerfulness (*χαρά*), discreetness (*εὐλάβεια*) and a virtuous habit of will (*βούλησις*), each with subdivisions. Thus under virtuous will we have good-will or benevolence (*εἰνοία*), affability (*εὐμένεια*), cordiality (*ἀσπασμός*) and affectionateness (*ἀγάπησις*); under discreetness, shame or the fear of dishonor (*αἰδώς*) and purity (*ἀγνεία*); under cheerfulness, wholesome pleasure in the use of the higher senses (*τέρψις*), good-fellowship (*εὐφροσύνη*) and good temper (*εὐθυμία*).² These various affections and dispositions, regarded as habits or general modes of feeling and behavior, are set over against the turbulent 'passions' as species of quiet emotion befitting the wise.³ In addition to these two classes of 'passions' and 'good affections,' the one remorselessly condemned, the other approved, the Stoics recognized two other classes of affections, the natural affections arising from kinship, companionship, etc., and physical pleasures and pains as distinguished from the elation or depression of mind attending them. The former, although not having the character of 'good affections' as dispositions of a virtuous will, were regarded by the Stoics as good, or at least as not in themselves evil, and the latter as at least necessary; but as to the goodness or badness of bodily pleasures and pains, opinions differed.⁴

¹ See Chaignet, *op. cit.*, p. 149.

² Diog. L., VII., 115. The English terms translating the Greek in the text are at best only approximately equivalent; in both languages the terms are equivocal. Alex. Aphr., 'Com. in Arist. Top.' II., p. 96, Ald., p. 181, says that the first to distinguish ἡδονή, χάρα, εὐφροσύνη and τέρψις was the Sophist Prodicus. He himself regards the words as all meaning substantially the same thing. The Stoics, he says, distinguished ἡδονή, an irrational elation; τέρψις, pleasure from hearing; εὐφροσύνη, pleasure from discourse. Others, however, stated the distinctions somewhat differently; thus Andron., π. παθῶν (v. Arnim, 'Stoic. vet. frag.', III., p. 97) defines τέρψις as 'pleasure from sight or hearing.' Cf. Sen., *E.P.*, 59, 2.

³ Cic., 'Tusc. D.' IV., 12f.

⁴ On this difference of opinion see Stob., 'Ecl.' II., 58, 3; Sext. Emp., XI., 73. On the fourfold distinction of affective states made by the Stoics, cf. R. D. Hicks, *op. cit.*, p. 102.

Understanding, then, that the 'passions' formed only one class of affectional states, we return to their definition. As already described, they are regarded by the Stoics as commotions arising in unbridled, irrational impulse, and therefore contrary to nature. It was agreed on all hands that such ebullitions of impulse had a disturbing effect on the intellectual processes, and this was considered a reason why the wise man would seek to be rid of them.¹ But they not only disastrously affect judgment, they take their rise, according to the Stoics, in judgment, and from this point of view the various passions are described as kinds of judgment or opinion. The Stoic psychology thus recognizes in a 'passion' the three elements or aspects of judgment, feeling and impulse, without, however, sharply discriminating them. The aspect at first emphasized was the movement of the soul towards or away from the object, that is, the impulse; but this movement had to be accounted for, and the most obvious explanation was that the mind entertained a certain opinion concerning the good or evil nature of the object. At any rate they looked upon this opinion as an integral and essential part of the process. Accordingly the 'passion' itself came to be defined as primarily an opinion or judgment. Here is the origin of the intellectualistic theory of emotion which has prevailed in the schools even down to recent times.

This intellectualistic tendency was more especially developed by Chrysippus.² The 'passions,' according to him, are erroneous, ill-founded judgments (*κρίσεις*), in Cicero's phrase, *judicia levitatis*.³ Another form of the doctrine spoke of the 'passion' as a 'sudden' or 'fresh'—meaning, perhaps, hasty—opinion (*δόξα πρόσφατος*; Cic., *opinio recens*).⁴ But

¹ Themistius, 'de an.', 90b, Spengel, II., 197, 24; Cic., 'Acad. Post.', I., 38.

² In his work 'On the Passions,' numerous fragments of which are preserved in Galen, 'De Hippocratis et Platonis Decretis.'

³ Cic., 'de fin.', III., 31. Cf. Them., in 'Arist. de an.', III., 5.

⁴ Posidonius, whom Galen, *op. cit.*, V., p. 416, Kühn, follows, interprets the phrase as referring to the suddenness or imminence of the falsely opined good or evil; Cicero, 'Tusc. D.', III., 75, interprets it as referring to the fresh vigor of the judgment. The text suggests that a 'snap' judgment would come near to expressing its meaning; it is at any rate an immature opinion, the opposite of the calm, reflective judgment of the wise man. Cf. Siebeck, 'Gesch. d. Psychol.', I., 233.

Chrysippus went still further. Regarding the whole soul as rational, he refused to allow that the 'passions' were affections of the lower part of our nature which reason had to control, as Plato had taught, and boldly declared them to be diseases of the reason itself. As Plutarch states the doctrine, lust, anger, fear, etc., were perverse opinions and false judgments, not formed in some inferior faculty, but such motions back and forth, such operations and energies of the whole directive faculty, as are ready to be turned with the greatest ease this way or that, "like the sudden motions and irruptions in children, the violence and impetuosity whereof, by reason of their imbecility and weakness, are very fleeting and inconstant."¹

A consequence of the Stoic conception of the 'passions' as judgments, or as essentially involving judgment, and as perversions of reason, or at least hostile to reason, was that 'passions' in the proper sense of the term were denied to brutes. "For," they argued, "all disorders and perturbations of the mind arise from a disregard of reason; hence they arise only in men; for though beasts act similarly, they are not similarly perturbed."² Seneca, in denying that brutes have anger while allowing them ferocity, put the general contention neatly by saying "dumb brutes do not have human affections, but have similar impulses (*similes illis quosdam impulsus*)."³

The doctrine of Chrysippus that the 'passions' are affections of the reason was vigorously criticized by Posidonius (130-46 B.C.), who represents the mediating tendency of the later Stoicism, which sought to reconcile the general spirit of the teachings of the Porch with those of the Academy and the Lyceum.⁴ It seemed impossible to Posidonius to account on this theory for the origin of a passion. How can that which is irrational spring from reason? It is incredible that a

¹ Plut., 'de virt. mor.', 7 ('Morals,' ed. Goodwin, III., p. 478); Cic., 'Tusc. D.', IV., 22. Zeno seems to have been content with the traditional view of the faculties, distinguishing three according to Tertullian, 'de an.', 14, eight according to Nemesius, 'de nat. hom.', p. 96.

² Cic., 'Tusc. D.', IV., 31.

³ Sen., 'de ira,' I., 3.

⁴ A full report of his arguments is given by Galen, *op. cit.*, IV., and V.; cf. Sext. Emp., 'adv. Math.', VII., 93.

faculty should give rise to a movement whereby its own action is impeded. Moreover, the doctrine fails to explain the accepted facts; why, e. g., ideas of even the greatest good and evil arouse no 'passions' in the wise, while fools are upset by the most trivial things; why the same or similar ideas excite different persons differently; why emotion should be so much influenced by habit. Why, further, should a 'recent' or 'sudden' opinion cause passion, and one old and familiar not? And how is it possible to suppose that reason at one and the same time knows a thing to be evil and yet falsely opines it to be good? For these and other reasons Posidonius reverted to the Platonic tripartite division of the soul, emphasizing the dualism of the rational and irrational faculties and ascribing the 'passions' to the latter. He regarded, moreover, the 'concupiscent' and 'irascible' susceptibilities from which the passions spring as determined by the constitution of the body. Thus the 'passions' are neither judgments nor necessary consequences of judgments; they often arise from a movement in the 'passional' side of our nature without any judgment at all. Posidonius has, therefore, no difficulty in ascribing passions to the lower animals. The basis of the passional disposition lies in the congenital constitution: the broad-chested and warm are courageous; the broad-hipped and cold, timid in men and in brutes. And similarly of the other passions.¹

The tendency of the later Stoics to adopt the views of their opponents in explaining the operations of the 'passions' is well illustrated by a story told by Aulus Gellius.² He was once in the company of an eminent Stoic philosopher during a storm at sea. The passengers were much interested to see how a Stoic philosopher would behave under such circumstances, and even forgot their own peril as they watched him grow pale with fear. After the storm was over, one of the passengers, a luxurious Asiatic, asked him banteringly why he, a philosopher, had shown fear, while he himself had been unmoved. To this the philosopher replied by citing the

¹ Cf. Zeller, 'Phil. d. Griechen,' IV., p. 579ff; Siebeck, *op. cit.*, I., p. 234f.

² 'Noctes Atticæ,' XIX., 1.

answer given on a similar occasion to a questioner of similar character by Aristippus the Socratic: "You had no cause for anxiety for the life of a miserable profligate, but I had reason to be alarmed for the life of Aristippus." But when Aulus asked him seriously for the explanation, he replied by taking from his wallet a book of Epictetus in which he read that, according to the Stoics, certain impressions called *phantasiæ* are made on the soul by certain objects and that it is not in our power to determine whether or when we shall be invaded by them, so that the soul, even of the wise man, may be moved for a time by grief or fear; but this does not imply that the soul accepts, approves, or consents to these impressions. It is within our power to refuse to do so, and the difference between the fool and the wise man lies precisely in this, that the one yields and consents to them and the other does not. Augustine, who repeats the tale, concludes that there is no difference, or next to none, between the opinion of the Stoics regarding the passions and that of other philosophers; for all agree, he says, in holding that the mind and reason of the wise man is not subject to them.¹

There are, however, four ways at least in which this freedom from subjection to the passions may be conceived. (1) The wise man does not experience them at all; his whole mind is one perpetual calm. This was the orthodox Stoic view as popularly understood. (2) The perfect man experiences them, but always as expressions of his virtuous character, always at the right time, in the right way, towards the right objects. This represents the Peripatetic ideal. (3) The good man is temporarily affected, but quickly recovers and through the exercise of habits of control and considerations of reason moderates the force of the passion and shortens and deflects its course. This may be called the common-sense view; it is the one suggested on the surface by the story of Aulus Gellius. (4) The man both is and is not affected by the passion. The passion is a natural phenomenon which takes place in him and of which he is aware, while at the same time he himself, or some deep underlying part of himself,

¹ Aug., 'de civ. Dei,' IX., 5.

remains unmoved by it; in the midst of his fears he is fearless, his ebullitions of anger leave him calm. His attitude towards his emotions is detached. This may be called the mystic view. Epicurus maintained it, as we have seen, in respect to pain. Plotinus, as we are soon to see, maintains it on the basis of his metaphysical conception of the soul. It naturally connects itself with the dualism of the Platonic-Aristotelian philosophy in sharply separating the reason from the other faculties; so far as this separation was made by the Stoics, it fell in very well with certain of their tendencies also. There is a suggestion of it beneath the surface in the narrative of Aulus Gellius. Plotinus uses the very conception of the *phantasiae* there referred to in explaining the turbulence of emotions such as fear. The view thus recurrent in the ancient world persists to be dealt with by modern psychology in the light thrown upon the facts chiefly, it must be admitted, from the region of the abnormal, though it does not follow that they are to be themselves regarded as pathological.

A great deal of ingenuity was expended by the Stoics on the classification of the 'passions.' This, along with the definitions they gave of the several kinds, was their most distinctive contribution to the psychology of the subject on its systematic-formal side. All the 'passions,' they held, were fundamentally four: appetite, or desire (*ἐπιθυμία*, Lat., *libido*), fear (*φόβος*, Lat., *metus*), pleasure, or delight (*ἡδονή*, Lat., *voluptas*, *lætitia*), and pain, or grief (*λύπη*, Lat., *aegritudo*). As irrational impulses (*ὅρμαι*) they were defined as follows: appetite (desire) is an irrational inclination towards (*ὅρεξις*); fear, an irrational recoil from (*ἔκκλισις*); pleasure (delight), an irrational expansion or elation of mind (*ἔπαρσις*); pain (grief), an irrational contraction or depression of mind (*συστολή*).¹ On the theory that the 'passions' were, or had their roots in, judgments or opinions regarding good and evil in their objects, they were defined, typically, in this way: appetite is an opinion of coming good, which, if already

¹ Andron. Rhod., *περὶ πάθων*, I, p. II, Kreutner; Stob., 'Ecl.' II, 90, 7W. The germs of this fourfold division are in Plato, 'Phileb.', 32B, 39C. It is unfortunate that the same words, *ἡδονή* and *λύπη*, here used for emotions, have also to do duty with the Stoics for simple sensory pleasure and pain.

present, would be of advantage; fear is an opinion of impending evil which seems intolerable; pleasure (delight, joy) is a 'recent' opinion of a present good wherein it seems right to the mind to be elated; pain (grief, sadness) is a 'recent' opinion of a present evil wherein it seems right to the mind to be dejected and contracted.¹ Over against three of these irrational 'passions' were set the three 'good affections' as rational feeling-tendencies: cheerfulness is opposed to pleasure as rational elation, discreetness to fear as rational disinclination, will to appetite as rational inclination. No good affection corresponded to grief.

Under the four fundamental 'passions' the Stoics included all manner of emotions and emotional dispositions which they disapproved. Andronicus of Rhodes enumerates twenty-seven kinds of appetite, thirteen of fear, five of joy and twenty-five of sadness or grief.² Other lists were shorter. We may take as representative the classification of Stobæus. Here under appetite are grouped anger and its varieties (resentment, rage, wrath, spite, bitterness), passionate love, longing, yearning, love of pleasure, wealth, honor, etc.; under fear, timidity, anxiety, consternation, shame, confusion, religious fear, awe and dread; under the pleasure-passion, malevolent pleasure, joy in unexpected good fortune, pleasure in magic tricks (*γοντεῖαι*), etc.; under the pain-passion, envy, emulation, jealousy, pity, mourning, heaviness of spirit, dumb grief, trouble, anguish, poignant grief, distress. Stobæus remarks that some of these terms, e. g., pity, envy and malevolence, point to the source of the emotion, while others, like poignant grief and dread, refer to some peculiarity in the emotion itself.³

As already indicated, the definition of the class varies according as the 'passion' is conceived more prominently as impulse or as opinion. Thus fear is defined as "an opinion of impending evil that seems intolerable," but also as "an

¹ Cic., 'Tusc. D.' IV., 7, 14; cf. Stob., 'Ecl.' II., 88, 6W.

² v. Armin, 'Stoic. vet. frag.' III., p. 96f. For other lists see Diog. L., VII., 111f., Cic., 'Tusc. D.' IV., 7, Nem., 'de nat. hom.' 19-21.

³ Stob., 'Ecl.' II., 90, 7; 92, 18. The definitions help to suggest the corresponding English terms, but as already remarked there can be no thought of exact equivalence.

avoidance of evils without reason accompanied by a low and broken condition of the vital energies."¹ Sometimes the two conceptions are combined as in the definition of fear as "a recoil by reason out of control arising from an opinion of impending evil."² The different 'passions' included in each class are defined in general by adding to the class name the specific difference. Thus, to illustrate, envy is defined as grief at another's prosperity, that prosperity causing no injury to the envious person; jealousy, as grief at another's possessing what one has desired for oneself ; pity, as grief at the misfortune of one whose suffering is undeserved; mourning, as grief at the death of one dear to us.³ Such definitions, which follow in the main the model set by Aristotle, we feel to be largely verbal and only at the best the rough preliminaries of a psychology; and it must be admitted that the Stoics are more concerned with discriminating and fixing the meanings of terms than with the analysis of the states of mind the terms stand for. It was recognized, indeed, that the distinctions were made from different points of view, but the analysis in this direction is not carried very far.⁴ Nevertheless, we should not underestimate the attempt to classify the emotions, to reduce them to a few fundamental forms, to group under each form its several varieties, and to take the terms used in common speech to denote the diversities of emotional experience and stamp them with a precise, technical meaning. Such an undertaking is an essential part of science. Even the discrimination of synonyms involves a certain amount of psychological analysis. Down to the end of the 17th century the classical writers on emotions all followed the lead of the Stoics in seeking to reduce, classify and logically define them. Nor is the problem wholly foreign to the psychology of our own time, though we are probably more keenly aware of the limitations of language to express the subtle shadings of feeling and find other aspects of the psychological problem both more important and more fruit-

¹ Both given by Cic., 'Tusc. D.', IV., 6, 13; 7, 15. Cf. Diog. L., VII., 116.

² Stob., 'Ecl.', II., 172. See Siebeck, *op. cit.*, I., p. 504.

³ Cic., 'Tusc. D.', IV., 17f.

⁴ Cf. Siebeck, *op. cit.*, I., 2, p. 233.

ful. Along with its obvious shortcomings it must, however, be regarded as a conspicuous merit of the first attempt of this sort that it selected as the basis of classification such fundamental characteristics of the emotional process as the antitheses of elation and depression and the opposed tendencies of approach and recoil rather than the simple qualities of pleasantness and unpleasantness.

Occasionally a single passion was made the subject of more extended discussion. The most famous work of this kind was the treatise by Seneca already mentioned in three books on anger.¹ Seneca, after giving other explanations, defines anger, with considerable psychological insight, as "a sudden and powerful agitation of the mind moving straight forward to the execution of vengeance, an agitation combined with will and judgment."² He disregards the distinctions drawn by Greek writers between the different kinds of anger because of the lack of corresponding Latin terms to express them, and skilfully marks off the differences himself by such epithets as bitter, sharp, peevish, clamorous, etc.³ In the process itself he distinguishes the involuntary arousal of the impulse, the conscious idea that what has been felt or perceived demands punishment, and the arrest of the reason in the further development of the passion.⁴ Along with these and other observations of permanent psychological value Seneca interestingly notes the manifestations of anger in the mob.⁵

The physiological side of the affections receives more or less explicit recognition in all the schools. On the basis of principles expounded in the medical writers of his time, Plato goes into details in the *Timaeus*; illustrations abound in the pseudo-Aristotelean *Problemata*. Theophrastus, Strato, Alexander of Aphrodisia and other Peripatetic writers,

¹ Among other works on the same subject we have Plutarch's 'de cohibenda ira' and a treatise *τεπλ ὀργῆς*, discovered at Herculaneum, the author of which was the Epicurean Philodemus, a contemporary of Cicero's.

² Sen., 'de ira,' II., 3.

³ *Ibid.*, I., 4.

⁴ *Ibid.*, II., 1ff. See Siebeck, *op. cit.*, I., 2, p. 233f.

⁵ 'de ira,' III., 2.

while upholding the doctrines of the master in other respects against divergent views of Platonists and Stoics, follow and develop his teaching in this direction also.¹ The Stoics would seem to have the material for a more special development in the form peculiar to them of the doctrine of the pneuma. They held the pneuma to be the very soul and substance of the universe, a substance possessing the highest degree of vital energy, perfect in 'tone,' with power to expand spontaneously and disperse itself without loss. It is in nature akin to air and fire which form, as it were, the soul of the physical world as earth and water form its body. The soul of man consists of pneuma, an ethereal substance present in the generative seed and continually nourished by exhalations from the blood.² This pneuma-soul is not, as the Epicureans held the soul to be, merely contained within the body; it pervades the body and is the vitalizing principle which holds its parts together. Now the obvious application of these conceptions in a doctrine of the passions would be to say that, so far as the passions appear as disturbances in the soul, they are the transcription and counterpart of actual physical movements or of qualitative changes of the pneuma; then the doctrine might be called upon to point out the particular modifications of the pneuma corresponding to each kind of passion and the relation of these modifications of the pneuma to those states of the body which it pervades and controls. This programme is not carried out. What we find are merely such general indications as follows.

Chrysippus represented the modifications of the pneuma that take place in emotion as modifications of 'tone.' The

¹ For illustrations see Siebeck, *op. cit.*, I., 2, pp. 224ff.

² See Chalcid. in 'Tim.', c.220; Epiph., 'adv. haer.' III., 2, 9 (*πολυχρόνιον πνεῦμα*); Galen, 'de plac. Hippocr. et Plat.' II., 8, reporting the ascription by Diogenes the Babylonian of the view that the soul was pneuma and nourished by the blood to all three founders of the school; Long. ap. Euseb., 'præp. evang.' XV., 21, 3; 20, 2; and Theod., 'gr. aff. cur.' V., 2, for the soul-pneuma as a sensitive exhalation (*ἀνθεψίασις*), a view ascribed to Zeno and Cleanthes. Souls were supposed to be continually generated from moist substances, a conception connected apparently with the doctrine of Heraclitus of the 'way up and down.' Justus Lipsius in his 'Physiolog. Stoicorum,' III., Diss. VI. and IX. quotes numerous passages from Stoic writers and their doxographers which show that the identification of the soul with the material pneuma was a common doctrine of the Stoics in all periods of their history.

'tone' of the soul is either normal or defective. This must be taken literally; the reference is not merely to consciousness, but to the material, conscious pneuma. That is either in good tone or lacking in tone (*εὐτονία, ἀτονία*), just as the nerves or tendons are either tonic or relaxed. Chrysippus uses this analogy. There is that in the soul, he says, which resembles the nerves or tendons, so that we can say metaphorically (*κατὰ μεταφοράν*) that it is 'nerved up' or 'enervated.' Now when one is struck with terror or succumbs at the prospect of gain or loss, the soul, *i. e.*, the pneuma, is 'enervated,' it is in a state of weakness, and it is from this weakness that evil actions arise.¹ In another passage he draws the analogy from general bodily conditions. As in the body there is strength and weakness, good tone and poor tone, and, relative to these conditions, health and disease, so the soul is said to be strong or weak, firm or flabby, etc.² Elsewhere comparison is made with the balance of the constituent elements of the body. As health consists in a normal, disease in a disproportionate relation of the hot, cold, moist and dry elements, so the soul is fair or foul according as the reason is thus or thus disposed with reference to its proper parts.³ This conception of the soul's 'tone' is perfectly general; it neither tells us what particular differences of tone correspond to the different passions nor how these differences are brought about. When, going beyond this, Stoic writers treat of the physical phenomena of emotion, they, like the writers of other schools, make use of common observation and current medical theory.

Seneca in a passage which sums up much of the ancient speculation and which seems to be the source of a great deal of the later writing on the subject, connects the dispositions to specific emotional reactions with the body's temperament and the various periods and conditions of life. As is the prevailing temperament of the body, so is the character of the man. Heat in excess makes men irascible, cold disposes them to timidity. Dealing with the passion of anger, Seneca

¹ Galen, *op. cit.*, IV., 6 (Kühn, V., p. 404; v. Arnim, *op. cit.*, III., p. 123).

² *Ibid.*, V., 2 (K., p. 438; v. Arn., p. 120).

³ *Ibid.*, V., 2 (K., p. 444; v. Arn., p. 121f.).

remarks that the common opinion that anger is excited by effervescence of the blood about the heart is due simply to the fact that the breast is of all parts of the body the hottest. Where the moist element abounds, anger develops gradually, time being required to generate the requisite heat. Thus in women and children anger is sharp, but of little consistency, at first, though it may swell in volume as the movement continues. In middle life—the dry period of life—anger is vehement and robust, but is not likely to be greatly augmented. The aged, sick and convalescent are rather irritable and querulous than angry, the heat being diminished by lassitude and loss of blood. Wine increases anger because it inflames; people of a florid complexion are irascible because of their heat.¹ Plutarch, eclectic, platonizing, writes in a similar vein, picturesquely describing also the visible effects of anger on gait and voice, on the color and aspect of the countenance, which it 'doth swell and puff very indecently,' on gesture and on speech.²

All this falls short of a thoroughgoing theory of the relation of the conscious affection to its bodily conditions, concomitants and expressions. Hot, cold, dry, moist and pneuma seem to be so many independent principles each of which is called upon in turn to play its part, but the intimate, organic connections of which, if any such exist, are not made plain. No doubt it lay in the spirit of Stoic metaphysics to regard these principles not as independent, but as differentiated modes of the all-pervading world-substance, and accordingly to view the affections as ultimately conscious modes of an organic cosmic process and more immediately of the bodily processes in the individual organism. But so far as appears no Stoic writer develops this doctrine or avails himself of the general conception in his observations and explanations in detail. That the emotions were in a sense physical must, of course, have been the opinion of all the philosophers who held the soul to be a material substance or composed of material

¹ Seneca, 'de ira,' II., 19.

² Plut., 'de coh. ira,' 6, 10. According to orthodox Stoic doctrine all the passions have their seat in the heart, the center of the psychic life. Nemesius, *op. cit.*, 19, 20, makes the organ of grief the orifice of the stomach.

substances, although if conceived, as the Epicureans conceived it, as merely contained within the body, it was always possible to think of its motions as arising spontaneously and as unaffected by general somatic influences. That all ordinary emotions took their rise in the body and had a bodily aspect, was a natural inference from Plato's doctrine of the mortal soul, was implied in Aristotle's doctrine of the soul as the body's entelechy and his explicit statement of the two-fold way in which an emotion may be viewed, and was expressly asserted by adherents of the Peripatetic school.¹ But the most pronounced formulation of the doctrine in antiquity is found in a writer in whom perhaps we should least expect to find it, namely, in Plotinus, who teaches emphatically and unqualifiedly that all ordinary affections of the soul are nothing but the soul's consciousness of the affections of its body and that an emotion, for example, was, in modern phrase, simply the consciousness of the bodily changes, or the emotion's 'expressions,' as they occur. In the way in which he connects this doctrine with a metaphysical conception of the soul, he is far enough removed from the metaphysical reserve commonly professed by modern physiological psychology, but his teaching is for that reason perhaps all the more illuminating. It is at any rate sufficiently interesting both in itself and as the final term of the historical development in the ancient world to attract our attention.

The interest of Plotinus in the affections is metaphysical and ethical; he seeks to vindicate in his theory his conception of the soul's essential independence and impassivity. The soul is in the body, he holds, not as a body is in space or an attribute in a substance or a part in the whole or the whole in a part or sensible form in sensible matter, but as the power exerted by an agent is in its instruments, as 'fire' (he says) is in the warmed and illuminated air. It energizes and animates the whole body and in specific ways the different parts of the body, giving to them thereby a 'trace' or 'impress' (*τύπος, ιγδαλμα*) of itself. In virtue of its intimate connection with the body the soul is conscious of the body's affections and

¹ See Siebeck, *op. cit.*, p. 225.

may identify itself with them and with their tendencies; but we must not think of the soul as affected nor, on the other hand, suppose the body sensibly affected without the soul. On this basis Plotinus enunciates the following specific doctrine of pleasure and pain. "Pain," he says, "is awareness (*γνῶσις*) of the recoil (*ἀπαγωγὴ*) of the body in the process of being deprived of the 'impress' of the soul; pleasure is the living being's awareness of the process of restoration of the harmony of the 'impress' of the soul in the body."¹ When, for instance, the body is wounded, the affection is perceived and localized, and we say, *e. g.*, that the finger feels pain and that the man feels pain, since it is the man's finger. But we cannot properly say, according to Plotinus, that the mere awareness of the sensation is pain. The consciousness is cognition having pain for its object, and the cognition, he urges, is not affected, otherwise it would not be able to give a true account of the affection. Pleasure and pain, then, are not affections of the soul, but of the living body. In the living body, similarly, arise the appetites which spring from these affections. This is shown by the varying character and strength they assume in the different periods of life. But although the soul is not in itself affected, still as the 'nature' operating in the process and seeking to direct the appetites, it is conscious of the body's limitations and identifies itself, as it were, with its longings. Plotinus follows Plato in making the seat of the bodily appetites the region about the liver and the seat of the nobler impulses of defence in the heart.²

Passions or emotions, defined broadly as states accompanied by pleasure or pain, originate, according to Plotinus, in two ways. Some arise in ideas (*ἐπὶ δόξαις*), *e. g.*, fear from the thought that one is at the point of death, joy from expectation of good fortune. But some arise independently of ideas and themselves take the lead, involuntarily exciting the opinion.³ Idiopathic emotion is recognized by other

¹ 'Enn.', IV., 4, 19. In 18 pain is referred to the unsuccessful struggle of the inferior nature to achieve a firm union with the superior.

² *Ibid.*, 21, 20, 28.

³ *Ibid.*, III., 6, 4: τὰ δὲ ἐστιν ὡς φύγοσάμενα αὐταὶ ἀπροαιρέτως ἐμποιεῖν ἐν τῷ πεφυκότι δοξάζειν τὴν δόξαν.

ancient writers; Posidonius, for example, makes use of it in criticizing the Stoics; but in no ancient writer perhaps is it so explicitly intimated as in Plotinus that the emotion thus arising independently of ideas goes on to complete itself by developing its own motive or justification. Plotinus insists, further, that an opinion is not an emotion in the faculty or process of thinking (*ἐπὶ τὸ δοξάζειν*); thought and emotion belong to quite distinct spheres (*ἐν ἄλλῳ . . . ἐν ἄλλῳ*). Nevertheless the two are intimately related in the emotional process. The idiopathic emotion, as we have seen, gives rise to an opinion and an opinion may be the starting point for an emotional disturbance which, when occurring, produces a certain consciousness of itself with which the opinion is conjoined.¹

If now we ask, what is the cause of the feeling, e. g., of fear, it is not enough to say, as is commonly alleged, disturbance arising from anticipated evil; for how can any disturbance arise directly from an opinion? An opinion, the representation (*φαντασία*), e. g., that some evil is about to befall, is a pure act of cognition and is neither itself an emotion nor, apart from accessory conditions, capable of exciting one. Plotinus finds these accessory conditions in an unconscious or subconscious psychical process mediating certain changes in the body—a kind of obscure thought and indistinct imagination (*ἀμόρᾳ οἷον δόξα καὶ ἀνεπίκριτος φαντασία*) operating in the organism and to be compared with the blind force of Nature producing the particulars of existence. The modern psychologist, according to his predilection, will think here of associational processes, psychical or psychophysical dispositions, instincts, Freudian complexes, etc.; Plotinus contents himself with the simple general conception of a blindly working function of the psyche animating the body. What he urges is that the whole process thus far considered, the whole

¹ Cf. ὁ δέκτης τῆς δόξης φόβος ἔλθων ἀναθεν αὐτὸν τῆς δόξης οἷον στήσοιν τινας παρασχών τῷ λεγομένῳ τῆς ψυχῆς φοβειόθα (ed. Müller, p. 223, 23). If ἀναθεν κ. τ. λ. is taken with ἔλθων, the main assertion appears to mean merely that the πόθος is consciously taken note of; but if, as seems possible, the clause goes with παρασχών, we have the more interesting view indicated that the conscious emotion is determined and defined by the idea of its object as the exciting cause.

process short of the bodily changes, consists not of 'passions,' but of the soul's activities. But what follows (*τὸ δὲ πότε τούτων*) is a complex of bodily affections—trembling, paling, speechlessness, etc. In the last resort it is not the soul which is perturbed, but the animated body. But the soul is immediately, sensibly aware of this perturbation and associates with it the idea of impending evil. And in this synthesis the emotional process is completed.¹

A similar explanation is given of anger. We are angry, indeed, not only at our own body's sufferings, but also at the sufferings of our friends and at violations of the proprieties generally. Perception and understanding, therefore, play a part in the emotion, and we might consequently be tempted to look for the origin of the impulse outside of the merely vital energies of the organism. On the other hand, we cannot help noticing that the disposition to anger follows the constitution and condition of the body. In animals as in men the hot-blooded and bilious are quick to take offence, the cold-blooded and those deficient in bile, slow; and the very same person is more disposed to the emotion in sickness than in health, when hungry than when sated. These facts make it clear, in the view of Plotinus, that the beginnings of anger are due to the bodily constitution and that the liver and the blood are, as it were, the animating principles of its motions. When, therefore, the predisposed body is affected, the immediate effect is a stirring up of the blood and the bile. Now the soul perceives this, and the imagination which unites the soul with the state of its body, allows reason to become conscious of the pain—the breaking up of the natural harmony of the animated body—and the soul which, from its own superior point of view, looks on injustice or injury of any sort in a calmly rational manner and is not inclined of itself to enter into the affections of the body, is made the ally of the passion. This view of the origin of anger is confirmed by the observation that those who are little inclined to indulge their bodily appetites and, in general, pay slight attention to the body are relatively less disposed to this and other similar

¹ III., 6, 5: *καὶ συνέσευκται τῷ ταραχῇ ἡ τοῦ προσδοκωμένου κακοῦ εἰκών.*

affections. Let it not be objected that if the principle of the passion is placed in the vital forces of the organism—in the terminology of Plotinus, the vegetative soul—then trees ought to feel anger: the obvious reply is that trees have neither blood nor bile; if they had, but were without sensation, there would only be an effervescence of these humors, but if sensation were added, then doubtless there would also be an impulse to repel the injury.¹

Although thus referring bodily pleasures and pains and emotions like fear and anger to the physical organism, Plotinus admits spiritual feelings and impulses, such as the longing for knowledge and pleasure in its possession, excited by the mind itself.² The rational soul is thus not absolutely impassive. In particular he contends for a state of happiness (*τὸ εὐδαιμονεῖν*) possible to one who finds pleasure in the good. He who has within himself the unchangeable good will not be moved by common griefs, happiness will not fail him even in the bull of Phalaris.³ This doctrine of a source of feeling independent of the body is common to many ancient writers, from whom it passes over to the Church Fathers, being, we may say, a practically indispensable component of any orthodox interpretation of Christian doctrine. Also the doctrine of the power latent in such a transcendent source of feeling of resisting ordinary afflictions and annulling the force of physical pain plays a not inconsiderable part in the psychology of the mystics and in thinkers generally who, from Plato and Aristotle down, make a sharp cleavage between the rational or spiritual part of our nature and the sensible. We have already noticed the part it plays in the teachings of Epicurus and the Stoics.

In concluding this study of affective psychology in writers after Aristotle it may not be inappropriate to sum up briefly the impressions left by a survey of the work of Greek writers generally in this field. The whole movement, as already observed, is controlled by practical interests and the results

¹ *Ibid.*, IV., 4, 28.

² See Siebeck, *op. cit.*, p. 328f.

³ ‘Enn.’ I., 4. Cf. Dionys. Areop., ‘de div. nom.’ II., 9, quoted by Thomas Aquinas, ‘S.T.’ q. XXII., a.3: non solum discens, sed etiam patiens, divina.

are conditioned in no small degree by ethical and metaphysical considerations which to the modern mind lie outside of psychology, but which, nevertheless, are constantly tending, explicitly or implicitly, to intrude themselves. In ancient writers the intrusion is explicit; it furnishes the motive, sustains the enquiry. In spite of this we have here the fruitful beginnings of a science. Human nature is subjected to observation and analysis, theories regarding human affections are developed of wide-reaching influence. The conspicuous illustrations are the doctrines of Plato and Aristotle concerning pleasure and pain. Sir William Hamilton held that all theories of pleasure and pain were modifications of these two, and much might be said for this opinion.¹ Even Kant held with Plato that all sense-pleasure is conditioned on pain;² the affinity of modern biological theories of pleasure and pain to the views of Aristotle is so obvious as to have become a commonplace. On the formal, logical side the emotions are treated by the Greeks with unusual fulness, not altogether to advantage. This is particularly conspicuous in the endeavor of the Stoics to define and classify them. On the other hand, much attention is given to the physical phenomena, the tendency being to regard the bodily commotion as of the very essence of the emotional 'affect.' And although the Hippocratean physiology employed to explain the more striking phenomena of the coarser emotions is now antiquated, the influence of conceptions like those of the body's humors, vapors and temperatures, and particularly of the 'pneuma,' is seen throughout the whole of the Middle Ages, in the psychology of the Renaissance, in the 'animal spirits' of Descartes and Malebranche, and in still later writers, as well as in current forms of popular speech. Finally, there appears in these ancient writers a growing sense of the complexity of the problems: states of feeling are mixed and compounded, pass into one another, variously influence and are in turn influenced by thought and action, develop into habits and dispositions, inhibit one another, grow out of and react on

¹ Hamilton, 'Lectures on Metaphysics,' 5th ed., I., p. 444f.

² Kant, 'Anthrop.,' 58.

bodily conditions and are no less manifestly related to conditions in the social environment. The facts are noticed and partly accounted for. Some of them, as, *e. g.*, the apparent detachment of mystical feeling, to a marked degree, and all of them to a certain extent, evidently contain problems that point to the future, to a more developed psychology and to a more developed physiology. But in comparing the actual achievements of modern psychology in this field with the ancient it may very well be doubted whether the advance is in any degree proportionate to the vast amount of time that has elapsed; it is certainly not such as to justify any high degree of pride in our own attainments or of contempt for those who first made them possible.

THE NATURE OF MENTALITY

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MENTALITY AS ADJUSTMENT

Recent investigations of the unconscious phases of the mind have brought forth much valuable material; but they have sometimes suffered from what appear to us to be inaccurate concepts of mentality. We would like to approach these valuable findings by way of a preliminary statement of the nature of mentality as we wish to have it understood.

Mind or mentality means a certain mode of doing things on the part of an organism. An organism has other ways of doing things besides that way which constitutes mentality. The building up of waste tissue by way of the blood is not a mental process, nor the healing of a wound, nor organic growth in any form. Mentality on the other hand appears in writing a poem, building a house, mowing a lawn or organizing a social campaign. What then is the difference between these mental activities and that sort of behavior which is not mental? We must take a concrete example in order clearly to define the nature of mind.

When I endeavor to sketch the likeness of a man my whole mind is absorbed in the undertaking, for, while I am no artist whatsoever, I am very earnestly desirous of making it as perfect a representation as possible. Making such a sketch is a very clear case of mental operation. Of what does this mental action consist? It consists in the first place of tentative efforts to draw the man before I venture to mark the paper. I am actually moving my muscles and adjusting my whole nervous system in such a way as to make very slight movements, so slight as to be imperceptible to the naked eye, but movements, nevertheless, by which an imaginary outline is made supposedly representative of the man, before ever I

put pencil to paper. If a delicate instrument were attached to my hand in such a way as to record these movements, the tentative picture-making efforts would be revealed, although they are so slight that the naked eye cannot see them. Mental effort is nothing else than organic effort of this most delicate and tentative form. Mentality is that process by which we adjust the physical organism preparatory to some overt action upon the environment. When the organism is already adjusted by reason of some innate mechanism, hence no preparatory adjustments being required, there is no mentality involved. Such is the heart beat, the respiration ordinarily, digestion, the knee jerk, etc.

When the words "Draw that man" first fall upon my ears a number of physiological processes are stimulated to activity. Any one of these several tendencies, if isolated from the others, might be executed without the exercise of conscious mentality. But since they are simultaneously aroused they hold one another in abeyance because of their disorganized condition. They interfere with one another. In order to be executed they must be adjusted to one another in such a way as to constitute an orderly consecutive scheme of operation.

But our analysis is not yet complete. Thus far it would seem that the words "Draw that man" simply aroused a chaotic medley of tendencies. There is nothing inherent in such a chaos that would tend to reduce it to a definite scheme of procedure. If our analysis stopped at this point the inevitable conclusion would be that mind was some sort of mysterious entity that worked upon this chaos from without, reducing it to order. Yet this is precisely the conclusion that scientific psychology wishes to avoid.

As a matter of fact the operation of drawing the man does not require of me that I organize a system out of chaos. Previous mental operations of mine have long since established a certain system of tendencies which, in the form of an established system, is excited when the words "Draw that man" fall upon my ears. This system is more or less indefinite to be sure. In order to be executed on any particular occasion,

new tendencies, which may be aroused for the first time on that occasion, must be assimilated to it, and other tendencies which have previously inhered in it must be excluded or readjusted. Nevertheless this preëstablished indefinite system of tendencies constitutes a dominant propensity which serves as a governing agency in the process of drawing the man. The process of adjustment which constitutes mentality is the process by which numerous newly aroused tendencies are assimilated into this propensity, and the propensity itself modified, to the end that it may be fulfilled or executed.

Such a mental process stands in marked contrast to a non-mental one, such as that of a healing wound or metabolism. In the latter operations there is no organization of tendencies into a novel scheme which has never before been executed. On the contrary there is only one established and relatively invariable system of operation. In case of mind there are many different activities which tend quite as much to frustrate as to supplement the original propensity until they are adjusted to one another and organized into a single system of procedure. In the non-mental there are no frustrating tendencies, nothing requiring adjustment, the organization of activities being firmly established and operating automatically.

But in drawing the man we may have noted that we could pick up the pencil without giving our attention to it. In a sense it was an unconscious act; nevertheless it was a mental act. How are we to distinguish it from the non-mental acts? How can we have an unconscious mental act?

Picking up the pencil is a manifestation of mind because it is an operation which we had to learn. Just as we are now learning how to draw a man, so at one time we had to learn to pick up a pencil. At that time in our early infancy we had to make a great many tentative efforts, a great many movements had to be pruned down, gradually adjusted to one another and finally organized into a coördinated system of behavior by which the pencil could be firmly grasped and directed to the point desired. A great many reflex movements or previously acquired movements were put together

into that new combination which constituted picking up the pencil. Any such combination of movements which at some time in the past experience of the individual has been put together into an orderly system of behavior, is a part of the mind. Whatever has been put together under the control of some ruling propensity, can be taken to pieces again and put together into some other system under the control of some other ruling propensity. This taking to pieces of systems of tendencies and rearranging them and reorganizing them into new systems, is what is meant by mentality.

Many previously organized systems may be incorporated into the system which is in process of formation. In drawing the man we were not required to organize the system of activities by which the pencil was picked up. We found that system already established in the form of a habit and simply appropriated it as a subordinate part of the larger system we were forming. So it is that we are always forming larger systems of action, and in doing so are always assimilating older systems previously formed, some of which must be reorganized in order to adjust them to the new system in process of formation, others of which can be taken over without modification. Mind then consists of all systems of behavior which have been organized at some time during the life of the individual, or are now being organized, out of more elementary modes of behavior.

The prime essential in this systematizing of uncoördinated tendencies which constitutes mentality, is the preëxistence of some established system; for the entire organizing process is simply the process by which this original system of tendencies attains fulfillment. When any system of tendencies thus operates as the central nucleus in forming a new system we call it a ruling propensity. It is plain that the propensity itself is modified in the process of organizing the new system, and this modification may be so great as to transform it quite completely. Or again the process of modification and organization may continue indefinitely without attaining any final fulfillment. In such case the ruling propensity at any given moment in the process is the system evolved out of that

portion of the process immediately preceding. But in any case the existence of a preëstablished system or propensity as a governing motive is indispensable to that organization which constitutes mentality.

If we trace this organizing process of mentality back to infancy we find that in the beginning certain innately established systems or propensities served to initiate the process of mentality. These innate systems are not mental but the process by which they assimilate new tendencies and hence develop into larger systems is mental. These rudimentary combinations of reflexes are the nuclei of instincts. The instincts themselves, however, pass through a more or less elaborate process of development after birth and are organized and reorganized to suit the demands of an ever changing environment; hence they form an essential part of the mind. Indeed they are probably the most important part in as much as they constitute those original propensities to action which force the individual to organize and assimilate a great many diverse movements into a coördinated system in order to carry the propensity to fulfillment.

The manner in which such a propensity forces the individual into the mental process of organizing a multiplicity of movements into a coördinated system has been excellently demonstrated by an experiment described by E. L. Thorndike.¹

A kitten is placed in a box made of slats between which she can look out. The door is shut and is fastened with a small piece of wood falling into a slot. So far as the kitten's physical ability is concerned she could open the door with ease, had she sufficient mentality. When she becomes hungry a piece of fish is placed in front of the box beyond her reach. Immediately the food-getting propensity is aroused. That means that certain glands are excited so that the gastric juices begin to pour into the stomach, the salivary glands begin to secrete, the swallowing apparatus acquires a certain tonus or readiness to act, the seizing apparatus of claws, fore-

¹ E. L. Thorndike, 'Educational Psychology,' Vol. II, 'The Psychology of Learning,' p. 9. Cf. also R. B. Perry, 'Docility and Purposiveness,' PSYCHOL. REV., 1918, 25, pp. 1-10.

legs and jaws are slightly innervated, etc. This is the food-getting activity at the initial stage of operation. This is what is meant by the excitation of an original propensity.

But this propensity cannot get beyond this initial stage of futile excitation as long as the box door intervenes between the cat and the fish. Hence the propensity must continue in a state of excitation and the energy which is released by it must stimulate many other movements. Excitation of these other activities appears in the form of restless movements to and fro, clawing at the cage in all manner of ways, biting, rubbing, mewing, pushing etc. All these represent subordinate tendencies which have not been previously established as an essential part of that system constituting the food-getting propensity, but which are aroused now because of the accumulation of stimuli to which the kitten is exposed when she cannot reach the fish which lies so closely in front of her. Finally, quite by chance, the kitten happens to claw the latch in such a way as to open the door and gets the food.

She is again confined when hungry and goes through the same process, and likewise again and again. But the number of scratchings and other movements, which are carried out before the door is opened, rapidly become less and less. After a time, when so confined, she promptly puts her paw upon the stick, opens the door without any such superfluous movements as random clawing and restless darting to and fro. She has organized a definite system of movements by which she is able to procure the fish. She would never have been able to accomplish this organization but for the fact that: (1) She was impelled to seize the food by the original food-getting propensity (instinct); (2) Other secondary activities such as clawing, walking about, etc., were aroused, in part independently of the food-getting impulse by reason of stimuli which acted directly upon them, in part dependently upon the food-getting impulse by reason of more or less indefinite relations to that system; (3) This original propensity remained in a state of excitation until it had assimilated into a single system with itself all those movements which were necessary to its satisfaction and let fall into desuetude

all those which were not necessary, and thereby developed a system which included just those activities which open the door and no others.

Had the kitten a higher mentality the subordinate tendencies, such as mewing, scratching, moving about, might have been so numerous and diverse, or have been aroused so nearly at the same time, as to prevent one another from issuing in overt action. In such case they would have been maintained in the form of slight physiological processes, producing a labile interplay of tentative adjustments and nerve discharges until some sort of arrangement of activities had been evolved which would serve to open the door. Not until this arrangement of activities had been organized as a motor set of her organism would she have exerted her strength upon the box to obtain release. This mode of behavior would have represented a higher degree of mentality than the actual procedure which the kitten did carry out. It would have been higher not merely because the heterogeneous movements were restrained from exerting their full physical effect upon the environment until the scheme was worked out, but because this restraint made possible (or resulted from) a much more rapid transition from one kind of tentative movement to another and consequently the arousal of a far greater number and diversity of innervations and adjustments. But in any case the original propensity, making all this possible, would be an instinct.

SUBCONSCIOUSNESS

It is apparent that any system in process of formation may include a great deal which is unconscious. All subordinate systems which are included in the one being formed, but which have been organized in the past and require no further modification, would be unconscious portions of the evolving system. Such was the system of picking up the pencil, as a subordinate part of the larger system of drawing a man. These unconscious supporting systems are always far more extensive than the individual is aware. The focus of attention is never very extensive and always consists of those ac-

tivities which are being most rapidly and critically reorganized. There may be other portions of the system which are undergoing modification at the same time as that at the focus of attention, but at a less rapid rate and of less critical significance to the system as a whole. But the total system, including all the supporting systems which are semi-conscious, co-conscious and unconscious, is far more extensive than the individual ever imagines. To use Stanley Hall's analogy, the mind is like an iceberg, seven eighths invisible (unconscious), and the motive force which impels a man to act as he does is the total force of the entire system, only a small portion of which appears in consciousness. When we refer to any such entire system it will be understood that we mean to include all these unconscious portions, the preestablished supporting systems which enter into it. How vastly extensive these unconscious portions are it would be difficult to exaggerate, reaching back as they do to the earliest experiences of infancy and comprehending elements as diverse as mathematics and love.

But the unconscious is even more extensive than the range of any total system which at its apex is being developed in consciousness. In all of us there are systems of activities or tendencies to act which are not subordinate to, and do not support, the propensity which rules consciousness. Independent and refractory systems such as these can only arise in a very extensive and complex mentality, hence perhaps never arise among the lower animals; but they are very common among human beings, and particularly among the more intelligent. They do not contribute to mental ability, quite the contrary, for they are a mark of mental disease; but it is a disease which can only appear in a relatively complex mentality.

To illustrate the nature of these independent systems of the mind we might hypothetically endow our kitten with a more highly developed mind than she actually had. Suppose, then, that the kitten at some earlier time in its career had been trained not to eat fish, which would be quite possible with any kitten. This training has established a cer-

tain system of tendencies which, when excited by the sight and smell of fish, impels the kitten to ignore or retreat from the fish, rather than to seek to eat it. Now in the presence of the fish two independent and antagonistic systems of behavior are excited, one controlled by the food-getting propensity, the other by the protective or retreating propensity. Perhaps in the simple mind of the ordinary kitten both systems could not be operative at the same time, but with the more elaborate mentality with which we have hypothetically endowed her, both could be active. The food-getting propensity might dominate over the other quite completely so that the kitten would strive most energetically to get out of the box, but the other system would be active nevertheless in the form of slight physiological processes which interfere with the kitten's efforts to reach the food. In consequence of such interference it requires much longer time for the kitten to get out; or if she does get out with great difficulty for one or two times, she will be much longer in organizing that system of activities which we call learning to open the door, all because of that latent system which strives away from the fish. Here then we have an unconscious system which antagonizes the dominant system. The dominant system is partially conscious, although large portions of it are unconscious. This antagonistic system may be entirely unconscious, and it interferes with the process of bringing the dominant system to a state of efficient organization such that the kitten may be able to open the door promptly. She is frustrated in her efforts by an unconscious system which is part of her mind.

This case of the kitten is altogether hypothetical, but we can take a case from real life, which has been presented by Jung in his '*Analytical Psychology*.¹

A young lady with a group of friends was walking down the middle of the road when the beating hoofs of runaway horses were heard approaching from the rear. The others stepped to the side of the street and easily evaded the team, but the young lady seemed so frightened that she lost her

¹ C. G. Jung, '*Analytical Psychology*', pp. 359-364. Tr. C. E. Long.

wits and ran straight down the middle of the road directly in front of the horses. Only at the point of exhaustion did she cast herself at the side of the road. Upon investigation it was found that she was not ordinarily hysterical but quite the contrary. Some years before she had been in Russia during a revolution and in the midst of death and other dangers had shown most remarkable self-possession. Why was she so much less capable of escaping from the horses than were her friends? By means of the technique of psychoanalysis the unconscious systems of her mind were analyzed and a propensity was there discovered which had organized about itself a system of tendencies which acted independently of, and antagonistically to, the natural instinctive propensity to escape from the horses.

This antagonistic unconscious system was developed under the following circumstances. The party at the time of the accident was returning from the home of a man with whom the young lady was in love. Circumstances were such that this night was the one supreme occasion, perhaps the only occasion, that she could hope to receive a declaration of love from him. If hurt, she would be carried back to his house. She certainly was not conscious of trying to get hurt, and indeed was not hurt, but the independent antagonistic system which sought a meeting with her lover, was impelling her into one mode of behavior, which was frustrative to the self-saving system which impelled her to escape from the horses. This antagonistic system rendered the self-saving system inefficient.

Freudian literature is full of such cases illustrative of the 'unconscious conflict' between systems of behavior which have become so fixated that they will not yield to that reorganizing process of mentality by which all established systems as well as all newly arising tendencies are assimilated into one comprehensive system under the control of a single ruling propensity. Any such inertia of unconscious systems means a diminution of mentality in as much as mentality is precisely this process of organizing the total mass of physiological processes into one system to the end of fulfilling the

ruling propensity. This process of organization or reorganization requires the transformation in some degree of all the pre-established systems which enter into the process. Hence any tendency or system of tendencies which resists that degree of modification which is required for adjustment in the newly evolving system becomes the source of inefficiency and of all those phenomena of which the Freudians treat.

However it should be emphasized that conflict *per se* is not inimical to the most wholesome and highly developed mentality. Indeed quite the contrary is true. There could be no mentality at all, as we have defined it, if there were no antagonism or maladjustment between operative systems of behavior requiring their readjustment and reorganization, for mentality is precisely this process of reorganization and readjustment and nothing else. Conflict, or maladjustment, is the indispensable pre-condition of that readjustment which constitutes mentality. Conflict diminishes mentality and causes misery and inefficiency only when the antagonistic systems are so rigid or inert that they will not yield to the process of reorganization. Mentality is diminished or rendered abnormal not by the antagonism of systems of behavior but by the automatism of such systems. Mentality thrives upon uncoordinated behavior, providing the uncoordinated elements are sufficiently plastic. If every tendency of the organism were perfectly adjusted to every other, mentality would disappear.

CREATIVE MENTALITY

This relation between the process of mentality and coördinated behavior introduces us to a concept of prime importance. It arises in the answer to this question: Is mentality purely an instrumental process the sole function of which is to achieve coördinated behavior? Behaviorism all too frequently has treated mentality as though this were its sole function. But certainly the question must be answered in the negative.

The inherent function of any given tendency can be nothing else than its own fulfillment. It is not essentially a means

to any end unless that end is its normal fulfillment. The inherent function of growing grass, for instance, is certainly not to provide food for cattle. The inherent function of mentality is the achievement of coördinated behavior only in case such behavior is its normal fulfillment. Undoubtedly this is the normal fulfillment of a certain type of mentality. It might seem to be the only fulfillment in so far as we have treated mentality thus far. But we now wish to distinguish a second type of mentality.

Human beings manifest not only the process of organizing tendencies into coördinated systems, but they also display a process of organization which never produces a completed and final coördination, but continues indefinitely seeming to find no other fulfillment than the progressive evolution of a system which is never completed and never sufficiently coördinated to issue in overt action. This is the second type of mentality to which we refer.

Hence our analysis reveals two types of mental process. Orthodox behaviorism has restricted itself almost entirely to the study of one of these types only. But the second type is also quite in accord with its principles. The first type may be distinguished as a process which fulfills itself in the organization of some ultimate coördination of tendencies. It always culminates in some specific mode of interaction with the environment. The second type of mentality is a process which continues indefinitely, evolving some system of behavior, or series of systems, which never results in any ultimate adjustment. Adjustments may be made, issuing in overt action, but they are incidental to the further development of the given system; they are not ultimate adjustments.

In the first type of mentality, which we may designate as instrumental, we have seen that that mechanism by which the organizing process is controlled is some definite propensity which tends to bring itself to fulfillment by this very process of assimilating to itself all other tendencies and systems. We must now analyze the second type of mentality, which we shall designate the creative, and ascertain the mechanism by which the organizing process is directed.

This second type of mentality, the creative, arises out of an equilibrated conflict between two or more modifiable systems of behavior which keep one another from fulfillment and by reason of their mutual frustration constitute a continuous stimulus to the progressive outgrowth of new systems or the continuous evolution of some given system. But such a statement is hardly clear without an illustration.

Professor E. B. Holt, in his 'Freudian Wish,'¹ has made use of an excellent illustration for a different purpose. But it is especially adapted to our needs because Professor Holt has analyzed it solely in the interest of what we have called instrumental mentality. If we can show that the same data might also give rise to creative mentality, the two types of mentality will be set over against one another in clear cut distinction against the same background.

A man who is fond of mushrooms finds some while walking in the woods. But he recalls that some species are poisonous. He then experiences a conflict between two propensities, the one to eat what tastes good, the other to avoid poison. Shall he go on past the plants, casting backward many longing reluctant glances, or shall he sit down to eat with constant qualms and tremors of fear which quite destroy the enjoyment of the repast. If he follows either one of these two courses we have a case of conflict between two independent but maladjusted systems of behavior, the one seeking mushrooms, the other retreating from them.

Up to this point there has been only that slight degree of mentality involved in organizing each of the two independent systems. A much more complicated process will be required to adjust the two to one another. There are two possible methods of adjustment, illustrating respectively the instrumental and the creative types of mentality. As we have indicated, Professor Holt recognizes only the instrumental, although he does not use our terminology.

The adjustment which reveals instrumental mentality consists in dissociating the two systems and preserving them as independent and automatic propensities having no rela-

¹ E. B. Holt, 'The Freudian Wish,' pp. 125-8.

tion to one another. This is accomplished by learning from some infallible authority the precise marks of distinction between good and bad mushrooms. Thereafter every mushroom will be either good or bad. If the mushroom is seen to be edible, the food-getting propensity will be aroused and that only. The retreating propensity will not be excited and hence will not interfere with the eating propensity. If the mushrooms are plainly poisonous the retreating propensity will operate without interference from the antagonistic system, because the latter will not be active.

It is plain that this method of adjustment, the method of dissociation, does not involve any extensive reorganization of the two systems. Only that slight degree of reorganization is exercised which is necessary to bring about complete independence and automatism of the two systems. With this method mentality is exercised only to that minimum degree necessary to satisfy the original propensities by eliminating the conflict between them, and as soon as that is accomplished mentality ceases except as it may be exercised in eating or retreating. Conflict, the stimulus to mentality, is regarded as the great evil from which escape is sought.

But there is another method of adjustment which could be applied. This alternative method would consist in developing the antagonistic reactions to mushrooms until the systems of tendencies began to organize themselves about this plant, constituting, say, the scientific interest of botany. This new system of behavior, botanical investigation, instead of serving merely to dissociate the two original systems of fear and desire, becomes itself the predominant system comprehending these two original ones as subordinate functions of itself. Instead of mentality serving to satisfy fear and desire and then ceasing, fear and desire serve as motives to a progressive process which quite completely subordinates the original propensities. (Have not all the sciences arisen in some such fashion as this?)

Or again, the new and comprehensive system which arises out of the mutual frustration of the two original propensities may be that of psychological investigation. One may ob-

serve his reactions to mushrooms and find positive satisfaction in the conflict of tendencies because they serve to enlarge his system of psychological comprehension.

Or again, the new system which arises out of the reorganization of the primitive propensities may be that of humor. The whole experience with mushrooms reveals its humorous aspect. The two original reactions may remain, perhaps in a state of mutual frustration, but as constituent features of a humorous episode. (Here again may we not ask if all wit is not some such spontaneous reorganization of two antagonistic tendencies into a new system which arises so suddenly as to seem to flash into existence by magic, and which subordinates the otherwise meaningless and hopeless conflict to the function of creating this new system. We believe Freud's own interpretation of wit could be developed very readily into this theory.)

Still again, the new system arising out of the two opposing reactions to the mushrooms may be that of an ethical problem, the conflict serving to work out the features of an ethical theory.

So we might elaborate the possibilities of creative mentality arising out of these two conflicting propensities toward mushrooms. Whatever might be its form, and however it might be designated, as botany, psychology, wit, ethics, art, friendship or religion, it would be creative mentality rather than instrumental if it continuously brought forth new systems, or progressively modified some given system, without regard to the fulfillment of any particular propensity or completion of any final system. It is creative because it is directed to no other goal than the bringing forth of new systems for the sake of the process rather than for the sake of a final system.

This type of mentality seems to arise out of the very nature of the mind when two conditions are given. These two conditions are (1) complexity of the mental systems, and (2) their plasticity. In consequence of these two conditions no single system can operate as a ruling propensity, organizing the other systems of the mind under its control to the end of

its fulfillment. On the contrary the dominant system, by reason of its plasticity and the number, strength and diversity of the other systems, is itself modified so continuously and radically as to preclude its issuance in the form of a definite and completed scheme of conduct. In such case the subordinate systems are not passive beneath the control of the dominant system, but the readjustment is reciprocal among them all, the dominant system being transformed as much as they, hence there is no propensity which persistently seeks fulfillment in the form of a final and completed action, such as eating mushrooms or killing the foe or the like. On the contrary the process of reciprocal modification between the dominant system and the subordinate ones goes on indefinitely, producing a process of evolution which seems to have no teleology save the continuous elaboration of the dominant system or of a series of systems.

Of course it is understood that no human being exercises creative mentality alone. Any thing which serves to fixate the dominant system and transform it into a ruling propensity, halting the process of its continuous modification and making it the nucleus about which a definite and final system is organized and executed, gives rise to instrumental mentality. Many things may serve to give such rigidity to a mental system. Any strong and persistent stimulus such as hunger or fear will do it. Weariness renders the mental systems inert and so brings the creative mental process to an end. So also does long established habit. Age also removes that plasticity of behavior which is an essential pre-condition for this type of mentality. Among the lower animals the systems of behavior are perhaps never sufficiently plastic for this process of mind. Creative mentality may be the prerogative of human beings.

Summary.—Mentality is the process by which various stimulated tendencies of the organism are adjusted to the execution of a series of movements resulting in adaptation to the environment. Its mode of operation is the organization of diffusive tendencies into a definite system under the control of some dominant propensity having an instinctive

basis. This propensity consists either of an innate series of reflexes or of some system of tendencies which has been organized in the past experience of the individual and which persists as an established physiological motor set.

But where the organized systems of tendencies of the organism are sufficiently numerous and modifiable the process of their reorganization may continue indefinitely without issuing in any final completed system of behavior. Where the process of organization does result in a final system which can be fulfilled in execution, we call the organizing process instrumental mentality. Where the process continues indefinitely, never developing any system which can attain final satisfaction and thereby bring itself to an end, we call the process creative mentality.